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BULLETIN OF THE IRISH BIOGEOGRAPHICAL SOCIETY

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CONTENTS

Editorial.....	1
The oribatid and parasitiform mites of Ireland, with particular reference to the work of J. N. Halbert (1872-1948) Malcolm Luxton.....	2
The status of social wasps (Hymenoptera: Vespidae) in Ireland S. P. M. Roberts.....	73
The distribution of the smooth newt, <i>Triturus vulgaris</i> L., in Ireland Ferdia Marnell.....	84
<i>Ectemnius cephalotes</i> (Olivier) (Hymenoptera: Sphecidae), an aculeate wasp new to Ireland Colm Ronayne.....	97
The craneflies (Diptera) of Ireland. Part 2. Limoniidae: Limoniinae P. Ashe, J. P. O'Connor, P. J. Chandler, A. E. Stubbs, R. I. Vane-Wright and R. E. Blackith.....	102
The distribution of aquatic Coleoptera in Northern Ireland. Part 2: families Hydraenidae, Helophoridae, Hydrochidae, Hydrophilidae, Elmidae and Dryopidae Brian Nelson, Garth Foster, Richard Weyl and Roy Anderson.....	128

A checklist of the Siphonostomatoida (Crustacea: Copepoda) of Ireland J. M. C. Holmes.....	194
Is <i>Viviparus viviparus</i> (Linnaeus) (Gastropoda: Prosobranchia) a native species of Ireland? Dan Minchin, David Dodd, Frances Lucey and Ira Levine.....	229
Occasional Publication Number 3. <i>A checklist of Irish aquatic insects</i> compiled by P. Ashe, J. P. O'Connor and D. A. Murray.....	235
BOOK REVIEWS.....	237
INSTRUCTIONS TO CONTRIBUTORS	240
NOTICES.....	241

Bull. Ir. biogeog. Soc. No. 22 (1998)

EDITORIAL

Initially, it seemed very ambitious for the Society to attempt to publish two *Bulletins* in 1998 but thanks to the help of our sponsors, authors, referees and the Committee, the project has now been successfully completed. Mr J. M. C. Holmes played a major role in this success especially through his skill in converting garbled text on diskettes, caused by incompatibilities in computer systems, into coherent text. The Committee is very grateful to him for his invaluable assistance. In 1999, the Society will revert to publishing one annual *Bulletin*, i.e. No. 23.

An *Occasional Publication* of the Society was also published in 1998. Number 3 in the series, *A checklist of Irish aquatic insects* was compiled by P. Ashe, J. P. O'Connor and D. A. Murray to celebrate the holding of the XXVII Congress of the International Association of Limnology in University College, Dublin, during August 1998. A total of 1499 species is listed. Further details are given elsewhere in this Bulletin.

J. P. O'Connor

Editor

5 November 1998

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THE ORIBATID AND PARASITIFORM MITES OF IRELAND, WITH PARTICULAR REFERENCE TO THE WORK OF J. N. HALBERT (1872 - 1948)

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Abstract

The oribatid and parasitiform mites recorded by J. N. Halbert are listed with information on taxa described, modern terminology, synonymies, type material, original label information and precise location of records in the literature. These data are cross-referenced where necessary. Appendices listing the oribatid and parasitiform mites of Ireland, and their county records, are provided. These lists are annotated to indicate those species thus far recorded only for Ireland within the British Isles. There is a short discussion of the biogeography and possible origin of Irish mites. The Irish oribatid and parasitiform mite fauna is compared with that of the British Isles as a whole. *Pseudoparasitus ovatulus* (Halbert, 1915) is judged to be the senior synonym of *Pseudoparasitus dentatus* (Halbert, 1920).

KEY WORDS: Halbert; Ireland; mites; Oribatida; Parasitiformes.

Introduction

James Nathaniel Halbert was a consummate entomologist and acarologist. He is considered one of the most important entomologists during "The Good Years" of the Dublin Museum (Beirne, 1985). He bequeathed a considerable and significant body of work on the Acari and ranks with A. D. Michael and J. E. Hull as a stalwart of the early years of acarological research in the British Isles. It is probably true to say that his main acarological interest was in watermites (Hydracarina) and his publications and manuscripts on this group have been listed by Beirne and Stelfox (1948) and O'Connor (1979, 1980). He also worked on terrestrial mites, including those listed in the present paper. His work on Oribatida and Parasitiformes is published in four papers, those of 1907, 1915, 1920 and 1923. The Natural History Museum, Dublin has carefully maintained his collection of these and other groups although some specimens have disappeared (O'Connor, 1980). The following paper is based on a

comprehensive investigation of these collections and attempts to link Halbert's superb early studies with our present knowledge of the oribatid and parasitiform mite fauna of Ireland.

Oribatida and Parasitiformes of Ireland

J. N. Halbert was Ireland's pioneering acarologist, collecting largely in Co. Dublin and Co. Mayo. Following his final publication devoted to these groups (1923) it was another 25 years before further Irish records appeared (in O'Farrell and Butler, 1948). There was an upsurge of interest in the 1970s and 1980s, principally associated with the growing research in agricultural ecology (see citations in the reference list). Nonetheless, a glance at the county records in Appendices 2 and 4 will reveal that Ireland is still largely an acarologically uncharted territory. Only four counties (Dublin, Kildare, Mayo and Wexford) can account for 100 or more mite records in their lists, and many counties are completely lacking in published data.

This dearth of records is also reflected in a comparison of the fauna of Ireland with that of the British Isles as a whole (Table 1). Only about 70% of the oribatid/parasitiform genera of the British Isles have been recorded for Ireland, and only about 50% of the species. However, there are some species (7%) which have so far been found in Ireland but not in the rest of the British Isles. Until more detailed surveys are carried out, it is not possible to make considered biogeographical judgements. However, there does seem to be the suggestion of a Lusitanian element in the Irish mite fauna. *Conoppia palmicinctum* (Michael, 1880) (Oribatida) is the best documented of these (Luxton, 1990, 1996) and has been recorded only from Co. Kerry in Ireland, and Devon, Cornwall and Dyfed in Great Britain. *Favognathus cucurbita* (Berlese, 1916) (not listed here since it is a trombidiform mite) has been recorded once for the British Isles (by Purvis, 1982 in Co. Wexford) and is also probably a Lusitanian form (Luxton, 1987). Seyd (1992) discusses the possibility that mites reached Ireland in post-glacial times *via* a low-lying landbridge from Scotland across the Malin Sea in the late Quaternary and early Flandrian but finds this hypothesis difficult to sustain. He suggests that a more likely route was *via* transportation through the agency of wind, water or human and animal activity. It is certainly not beyond the bounds of possibility that much of the pre-glacial mite fauna of Ireland (as of other parts of the British Isles) survived the glacial periods in refugia (Seyd, 1992; Luxton, 1996; Seyd *et al.*, 1996).

Halbert's oribatid and parasitiform mites

Halbert published four papers containing records of Oribatida and of Parasitiformes (1907, 1915, 1920, 1923). He described as new four species of Oribatida, one of which has since been synonymised (see the following list of his records). His work on Parasitiformes was much more extensive. He established one new family, five new genera (one of which has since been synonymised and another elevated to genus from his original subgeneric ranking), and thirty-nine new species (twelve of which have since been synonymised). Four of his parasitiform taxa were described by him as varieties but three were subsequently elevated to species rank, and one was a misidentification (see the following list of his records). Two of his parasitiform species are considered here to be "incertae sedis" either because the descriptions and/or the specimens are inadequate for accurate placement or because specimens no longer exist. Two of his species ("*Laelaps*" *dentatus* and "*Laelaps (Hypoaspis)*" *ovatulus*) are newly synonymised in this paper as *Pseudoparasitus ovatulus*.

1. Oribatid mites recorded by J. N. Halbert, with notes on type specimens

The list is presented alphabetically with Halbert's names first followed, where necessary, by modern terminology or synonyms. Halbert's new species are marked with an asterisk.

Brachychthonius brevis = *Liochthonius brevis* (Michael, 1888)

1915, p. 107.

Carabodes affinis Berlese, 1913

1923, p. 380. (See also *Tegeocranus marginatus*)

Carabodes elongatus = *Odontocepheus elongatus* (Michael, 1879)

1915, p. 101.

Carabodes labyrinthicus (Michael, 1879)

1907, p. 66. (See also *Tegeocranus labyrinthicus*)

Cepheus bifidus = *Tritegeus bisulcatus* Grandjean, 1953

1915, p. 101.

Cepheus tegeocranus = *Xenillus tegeocranus* (Hermann, 1804)

1907, p. 66; 1915, p. 101.

Cymbaeremaeus monilipes = *Caleremaeus monilipes* (Michael, 1882)
1923, p. 381.

Damaeosoma clavipectinata = *Ramusella clavipectinata* (Michael, 1885)
1915, p. 104.

Damaeosoma lanceolata = *Banksinoma lanceolata* (Michael, 1885)
1915, p. 103.

Damaeosoma maculosa = *Ctenobelba obsoleta* (C. L. Koch, 1841)
1923, p. 380.

**Damaeosoma minus* var. *lamellata* = ?*Subiasella lamellata* (Halbert, 1923)
1923, p. 380. There is a slide in the Halbert collection labelled "*Damaeosoma minus* Paoli var. *hibernicus* Halbt. Poulanass Glendalough dead wood 18.8.1916 JNH" (and also, on another label, "*Damaeosoma minus* var. *herborarius* Halb Glendalough Co. Wicklow 18.8.16 J.N.H." [sic!]). Since there is only one "*Damaeosoma minus*" slide in the collection, only one recorded in the literature by Halbert, and the habitat data on the slide labels are the same as those published, it is to be presumed that Halbert decided on a new variety name in manuscript but neglected to alter the name on the slide labels. In any case, the matter is academic since there is no specimen beneath the coverslip. The description and figure of this oribatid strongly suggests that it is a member of the genus *Subiasella* since it has capitate, minutely spiculate sensilli, areolar patches between the bothridia, and an elongate hysterosoma. Confirmation will have to await the collection of further specimens.

Damaeosoma splendens = *Dissorhina ornata* (Oudemans, 1900)
1915, p. 104.

Damaeus clavipes = *Damaeus* (*Paradamaeus*) *clavipes* (Hermann, 1804)
1907, p. 66; 1915, p. 104.

Damaeus geniculatus = *Damaeus* (*Adamaeus*) *onustus* (C. L. Koch, 1841)
1907, p. 66; 1915, p. 104.

Damaeus verticillipes [sic!] = ?*Metabelba papillipes* (Nicolet, 1855)
1915, p. 104.

Hermannia bistrata = *Platynothrus peltifer* (C. L. Koch, 1839)
1915, p. 105. (See also *Hermannia carinata*)

Bull. Ir. biogeog. Soc. No. 22

Hermannia carinata = *Platynothrus peltifer* (C. L. Koch, 1839)

1907, p. 66. (See also *Hermannia bistriata*)

Hermannia convexa = *Hermannia gibba* (C. L. Koch, 1839)

1907, p. 66. (See also below)

Hermannia convexa (C. L. Koch, 1839)

1915, p. 104. (See also above)

Hermannia nanus = *Nanhermannia nana* (Nicolet, 1855)

1907, p. 66; 1915, p. 105.

Hermannia reticulata Thorell, 1871

1907, p. 66; 1915, p. 105; 1920, p. 136.

Hermannia scabra (L. Koch, 1879)

1915, p. 104; 1920, p. 135.

Hermanniella granulata = *Hermanniella picea* (C. L. Koch, 1839)

1923, p. 381. Examination of Halbert's slide reveals that his record of *Hermanniella granulata* is, in fact, of *Hermanniella picea*.

Hoploderma dasypus = ?*Phthiracarus clavatus* Parry, 1979

1907, p. 66; 1915, p. 108.

Hoploderma magnum = *Steganacarus magnus* (Nicolet, 1855)

1907, p. 66; 1915, p. 108.

Hypochthonius rufulus C. L. Koch, 1835

1915, p. 107.

Liacarus coracinus (C. L. Koch, 1839)

1915, p. 102.

Liacarus ovatus = *Adoristes ovatus* (C. L. Koch, 1839)

1915, p. 102.

Lohmannia insignis = *Perlohmanna insignis* (Berlese, 1904)

1915, p. 107.

Malaconothrus glaber = *Trimalaconothrus glaber* (Michael, 1888)

1915, p. 106.

Bull. Ir. biogeog. Soc. No. 22

Malaconothrus monodactylus (Michael, 1888)

1915, p. 107.

Malaconothrus tardus = *Trimalaconothrus tardus* (Michael, 1888)

1915, p. 106.

Neoliodes theleproctus (Hermann, 1804)

1907, p. 66. (See also *Nothrus teleproctus*)

Notaspis bipilis = *Ceratoppia bipilis* (Hermann, 1804)

1915, p. 102.

Notaspis exilis = *Zygoribatula exilis* (Nicolet, 1855)

1907, p. 66; 1915, p. 102.

Notaspis lacustris = *Hydrozetes lacustris* (Michael, 1882)

1915, p. 103.

Notaspis lucorum = *Phauloppia lucorum* (C. L. Koch, 1841)

1907, p. 66; 1915, p. 103.

Notaspis oblonga = *Eremaeus oblongus* C. L. Koch, 1835

1915, p. 103.

Notaspis similis = *Liebstadia similis* (Michael, 1888)

1915, p. 103. (See also *Oribatula similis*)

Notaspis venustus = *Oribatula venusta* (Berlese, 1908)

1915, p. 102. (See also *Oribatula venusta*)

Nothrus bicarinatus = *Camisia segnis* (Hermann, 1804)

1915, p. 105. (See also *Nothrus segnis*)

Nothrus horridus = *Camisia horrida* (Hermann, 1804)

1907, p. 66; 1915, p. 106.

Nothrus invenustus = *Camisia invenusta* (Michael, 1888)

1915, p. 106; 1920, p. 136.

Nothrus palustris C. L. Koch, 1839

1915, p. 105.

Nothrus segnis = *Camisia biurus* (C. L. Koch, 1839)

1915, p. 105. (See also *Nothrus bicarinatus*)

Bull. Ir. biogeog. Soc. No. 22

Nothrus spinifer = *Camisia spinifer* (C. L. Koch, 1835)

1907, p. 66; 1915, p. 105.

Nothrus sylvestris = *Nothrus silvestris* Nicolet, 1855

1915, p. 105.

Nothrus teleproctus = *Poroliodes farinosus* (C. L. Koch, 1840)

1915, p. 106. (See also *Neoliodes theleproctus*)

Oribata alpina = *Melanozetes stagnatilis* (Hull, 1914)

1915, p. 97. Described as a new species by Halbert (1915) but synonymy as noted.

Oribata avenifera = *Punctoribates punctum* (C. L. Koch, 1839)

1920, p. 132.

Oribata cuspidata = *Chamobates cuspidatus* (Michael, 1884)

1915, p. 100.

Oribata dorsalis var. *longiplumus* = *Acrogalumna longipluma* (Berlese, 1904)

1915, p. 99. (See also *Oribates nervosus*)

Oribata edwardsi = *Edwardzetes edwardsi* (Nicolet, 1855)

1915, p. 97.

Oribata fuscipes = *Fuscozetes fuscipes* (C. L. Koch, 1844)

1915, p. 98.

Oribata fusigera = *Minunthozetes semirufus* (C. L. Koch, 1841)

1915, p. 100.

Oribata globula = *Euzetes nitens* (Johnston, 1853)

1907, p. 66; 1915, p. 98.

Oribata gracilis var. *major* = *Ceratozetes gracilis* (Michael, 1884)

1915, p. 96.

Oribata lapidaria = *Chamobates subglobulus* (Oudemans, 1900)

1907, p. 66; 1915, p. 98.

Oribata lucasii (and *Oribata lucasi*) = *Scheloribates laevigatus* (C. L. Koch, 1835)

1907, p. 66; 1915, p. 100; 1920, p. 132.

Oribata mollicoma = *Melanozetes mollicomus* (C. L. Koch, 1839)

1915, p. 96.

Bull. Ir. biogeog. Soc. No. 22

Oribata orbicularis = *Sphaerozetes orbicularis* (C. L. Koch, 1835)

1915, p. 98.

Oribata ovalis = ?*Parachipteria punctata* (Nicolet, 1855)

1907, p. 66; 1915, p. 99.

Oribata parmeliae = *Mycobates parmeliae* (Michael, 1884)

1915, p. 100; 1920, p. 132.

Oribata piriformis = *Sphaerozetes piriformis* (Nicolet, 1855)

1915, p. 98.

Oribata quadricornuta = *Oribatella quadricornuta* (Michael, 1880)

1915, p. 99; 1920, p. 131.

**Oribata quadrivertex* = *Punctoribates quadrivertex* (Halbert, 1920)

1920, p. 131. There are three specimens in the Halbert collection labelled: *Oribata quadrivertex* n.sp. Malahide S.M.1 (30 May '15) coll. J.N.H. Reg. 58-1923. Condition: good.

Oribata setosa = *Trichoribates trimaculatus* (C. L. Koch, 1835)

1907, p. 66; 1915, p. 98; 1920, p. 131. There is a slide in the Halbert collection which contains three specimens of *Trichoribates trimaculatus* and five specimens of *Oribatula saxicola* Halbert, 1920. The slide is labelled: *Oribata setosa* (variety) *Notaspis* n.sp. *saxicola* n.sp. Malahide B.T. 52. Although "*Oribata*" *setosa* is generally considered to be synonymous with *Trichoribates novus* (Sellnick, 1928) it is probable that Halbert's "*setosa*" is referable to *Trichoribates trimaculatus* on the basis of this evidence.

Oribata sphagni = *Limnozetes rugosus* (Sellnick, 1923)

1915, p. 96. Although "*Oribata*" *sphagni* is generally considered to be synonymous with *Limnozetes ciliatus* (Schränk, 1803) the specimen on Halbert's slide is *Limnozetes rugosus*.

Oribates nervosus (*Oribata dorsalis* partim.) = *Pergalumna nervosa* (Berlese, 1914)

1915, p. 99. (See also *Oribata dorsalis* var. *longiplumus*).

Oribatula (*Hemileius*) *plantivaga* = *Dometorina plantivaga* (Berlese, 1895)

1923, p. 380.

**Oribatula saxicola* Halbert, 1920

1920, p. 133. There are two slides in the Halbert collection. The first is labelled: *Oribatula* (*Notaspis*) *saxicola* Halbt. Type Malahide B.T. 101 Reg. 58-1923 and contains two specimens.

Bull. Ir. biogeog. Soc. No. 22

The second slide also has two specimens and the condition of both slides is good.

Oribatula similis = *Liebstadia similis* (Michael, 1888)

1920, p. 133. (See also *Notaspis similis*)

Oribatula venusta (Berlese, 1908)

1920, p. 133. (See also *Notaspis venusta*)

Pelops acromias [sic!] = *Eupelops acromios* (Hermann, 1804)

1915, p.95.

Pelops fuliginosus = *Eupelops plicatus* (C. L. Koch, 1835)

1915, p. 95.

Pelops phaenotus [sic!] = *Peloptulus phaenotus* (C. L. Koch, 1844)

1915, p.96.

Phthiracarus arduus = ?*Rhysotritia duplicata* (Grandjean, 1953)

1915, p. 108.

Phyllotegeus palmicinctum = *Conoppia palmicinctum* (Michael, 1880)

1923, p. 379.

Scutovertex bilineatus = *Hygroribates bilineatus* (Michael, 1888)

1915, p. 100; 1920, p. 134.

Scutovertex corrugatus = *Ameronothrus lineatus* (Thorell, 1871)

1915, p. 100; 1920, p. 135.

Scutovertex maculatus = *Ameronothrus maculatus* (Michael, 1882)

1907, p. 66; 1915, p. 101; 1920, p. 135.

Scutovertex perforatus = *Passalozetes perforatus* (Berlese, 1910)

1920, p. 135.

Scutovertex sculptus Michael, 1879

1915, p. 100.

Scutovertex spoofi = *Hygroribates marinus* (Banks, 1896)

1920, p. 134.

Suctobelba trigona (Michael, 1888)

1915, p. 104.

Bull. Ir. biogeog. Soc. No. 22

Tegeocranus labyrinthicus = *Carabodes labyrinthicus* (Michael, 1879)

1915, p. 102. Halbert (1915) states that this record of the species should be viewed with reserve because the specimens are "not quite typical". (See also *Carabodes labyrinthicus*)

Tegeocranus latus = *Cepheus latus* C. L. Koch, 1835

1915, p. 101.

Tegeocranus marginatus = *Carabodes affinis* Berlese, 1913

1915, p. 101. (See also *Carabodes affinis*)

2. Parasitiform mites recorded by J. N. Halbert, with notes on type specimens

Section A. Supraspecific taxa named by Halbert.

Family: Thinozerconidae 1915, p. 80.

Type species *Thinozercon michaeli* Halbert, 1915.

Evans (1957) established the superfamily Thinozerconoidea to contain this family which is represented by a single genus and species. Karg (1989) included both the Thinozerconidae and the Protodinychidae Evans, 1957 within the superfamily. However, Evans and Till (1979) note that the systematic position of the genus is uncertain and have preferred to locate the family within the superfamily Polyaspidioidea. They point out that its relationship is with the Lower Uropodina and that it bears some affinities with the Protodinychidae. (See also under *Thinozercon* in sections A and B).

Genera

Alliphis Halbert, 1923, p. 369.

Type species *Gamasus halleri* G. et R. Canestrini, 1881

Halbert (1923) published the name *Alliphis* as a subgenus of *Copriphis*. Although he made no claims in this paper as to its novelty, it was subsequently accepted as valid and elevated to generic rank. (See *Copriphis (Alliphis) halleri* in section B)

Dendrolaelaps Halbert, 1915, p. 68.

Type species *Dendrolaelaps oudemansi* Halbert, 1915 (See also under *Dendrolaelaps* in section B)

Haluropoda Halbert, 1915, p. 87.

This genus has been relegated to the synonymy. Halbert (1915) established two species under

Bull. Ir. biogeog. Soc. No. 22

the name (See under *Haluropoda* in section B)

***Thinoseius* Halbert, 1920, p. 126.**

Type species *Thinoseius berlesei* Halbert, 1920 (= *Lasioseius fucicola* Halbert, 1920) (See notes under *Lasioseius fucicola* in section B)

***Thinozercon* Halbert, 1915, p. 82.**

Type species *Thinozercon michaeli* Halbert, 1915 (See under Thinozerconidae above and *Thinozercon* in section B)

Section B. Species recorded by Halbert.

The list is presented alphabetically with Halbert's names first followed, where necessary, by modern terminology or synonyms. Halbert's new species are marked with an asterisk.

***Antennophorus uhlmanni* Haller, 1887**

1923, p. 367.

Asca affinis = *Cyrtolaelaps mucronatus* (G. et R. Canestrini, 1881)

1915, p. 80. (See also *Gamasellus* (*Protolaelaps*) *mucronatus*)

Celaenopsis cuspidata = *Celaenopsis badius* (C. L. Koch, 1839)

1915, p. 79.

Ceratozercon bicornis = *Asca bicornis* (Canestrini et Fanzago, 1887)

1923, p. 375.

Cilliba cassidea = *Uropoda* (*Cilliba*) *cassidea* (Hermann, 1804)

1915, p. 85.

Copriphs (*Alliphs*) *halleri* = *Alliphs halleri* (G. et R. Canestrini, 1881)

1923, p. 369. (See also *Alliphs* in section A)

***Cyrthyrolaelaps hirtus* Berlese, 1904**

1915, p. 60; 1920, p. 113. (See also below)

Cyrthyrolaelaps hirtus (partim.) = *Cyrthyrolaelaps incisus* Evans, 1955

1915, p. 60; 1920, p. 113. (See also above)

Cyrtolaelaps cervus = *Veigaia cervus* (Kramer, 1876)

1915, p.62.

Bull. Ir. biogeog. Soc. No. 22

Cyrtolaelaps kochi = *Veigaia kochi* (Trägårdh, 1901)

1915, p. 63.

Cyrtolaelaps nemorensis = *Veigaia nemorensis* (C. L. Koch, 1839)

1915, p. 62.

Cyrtolaelaps transisalae = *Veigaia transisalae* (Oudemans, 1901)

1915, p. 62.

Dendrolaelaps cornutus (Kramer, 1886)

1923, p. 366. Halbert (1923) synonymised this species with *Dendrolaelaps bicornis* Hull, 1917.

However, the two species do not share the same characteristics and their equivalence must remain doubtful.

****Dendrolaelaps oudemansi* Halbert, 1915**

1915, p. 68. Two slides in the Halbert collection (one mouthparts only; the other a male).

Labelled: Westport July 1911 bark Reg. 55-1923. Condition: fair. (See also *Dendrolaelaps* in section A)

Dinychus (Prodinychus) carinatus = *Dinychus carinatus* Berlese, 1903

1923, p. 377.

Dinychus sp.

1923, p. 130.

Dinychus tetraphyllus = *Dinychus perforatus* Kramer, 1882

1915, p. 94.

Discopoma integra = *Uropoda (Uropoda) minima* Kramer, 1882

1915, p. 86.

Discopoma pulcherrima = *Uropoda (Phaulodinychus) pulcherrima* (Berlese, 1903)

1915, p. 86.

Epicrius geometricus = *Epicrius mollis* (Kramer, 1876)

1915, p. 80.

Euphis ostrinus = *Eviphis ostrinus* (C. L. Koch, 1836)

1915, p. 77.

****Gamasellus inermis* = *Digamasellus inermis* (Halbert, 1920)**

1920, p. 117. Two slides in the Halbert collection. The first is labelled: *Gamasellus*

(*Digamasellus*) *inermis* n.sp. Halbt. ♂♀ Malahide rocky shore Registered 58.1923 Type. The condition of the specimens is good. The second is labelled: *Gamasellus inermis* n.sp. ♀♀ Malahide B.T. 47 2.4.1916; there is only one specimen on the slide which is outside the coverslip and in poor condition.

****Gamasellus (Protolaelaps) granulatus* = *Leitneria granulata* (Halbert, 1923)**

1923, p. 364. One fragmented specimen in the Halbert collection together with mouthparts and capitulum. Labelled: *Gamasellus (Protolaelaps) granulatus* Halbt. Type. *Gamasellus granulatus* H. n.sp. Capitulum chelicerae etc (Tolka Valley) Co. Dublin *Gamasellus (Protolaelaps) granulatus* Halbt. Type. det. G. Owen Evans 1958. Evans established the new genus *Leitneria* in 1957 with Halbert's species as the type.

***Gamasellus (Protolaelaps) mucronatus* = *Cyrtolaelaps mucronatus* (G. et R. Canestrini, 1881)**
1923, p. 365. (See also *Asca affinis*)

****Gamasoides bispinosus* = *Gamasodes bispinosus* Halbert, 1915**

1915, p. 56. One specimen in the Halbert collection, mouthparts missing. Labelled: *Gamasoides 11-spinosus* Halbt. L. Fenagh, Mayo moss Sep Oct.'11 Type Reg.55-1923 (*Poecilochirus Gamasoides bispinosus* Halbt. L. Fenagh Mayo 12.x.1911). Condition: fair.

***Gamasoides carabi* = *Poecilochirus carabi* G. et R. Canestrini, 1882**
1915, p. 55.

***Gamasoides spinipes* [sic !] (partim.) = *Gamasodes fimbriatus* Karg, 1971**
1915, p. 55; 1920, p. 119. (See also below)

***Gamasoides spinipes* [sic !] (partim.) = *Gamasodes spiniger* (Trägårdh, 1910)**
1915, p. 55; 1920, p. 119. (See also above)

***Gamasolaelaps aurantiacus* = *Gamasolaelaps excisus* (L. Koch, 1879)**
1915, p. 58. (See also *Gamasolaelaps excisus*)

***Gamasolaelaps excisus* (L. Koch, 1879)**
1920, p. 114. (See also *Gamasolaelaps aurantiacus*)

***Gamasus (Amblygamasus) septentrionalis* var. *norvegicus* = *Pergamasus norvegicus* (Berlese, 1905)**
1915, p. 51.

Bull. Ir. biogeog. Soc. No. 22

Gamasus coleopratorum = *Parasitus coleopratorum* (Linnaeus, 1758)

1920, p. 119. (See also *Gamasus* (*Gamasus*) *coleopratorum*)

Gamasus crassipes var. *longicornis* = *Pergamasus longicornis* (Berlese, 1906)

1920, p.119. (See also *Gamasus* (*Pergamasus*) *crassipes* var. *longicornis*)

Gamasus (*Eugamasus*) *cornutus* = *Porrhostaspis lunulata* Müller, 1859

1915, p. 51.

**Gamasus* (*Eugamasus*) *crassitarsis* = *Eugamasus crassitarsis* (Halbert, 1923)

1923, p. 363. Two slides in the Halbert collection, both with identities confirmed by K. H. Hyatt in 1975 and annotated N.M.I. 18.1981. One slide labelled: *Eugamasus crassitarsis* Halbt. Albert M. Farm Glasnevin amongst soil 31.3.'22; the other (a male) labelled: *Eugamasus crassitarsis* Halbt Mt Garret Wood New Ross 14.3.22. Condition: good.

Gamasus (*Eugamasus*) *immanis* = *Vulgarogamasus immanis* (Berlese, 1904)

1915, p. 50. (See also *Gamasus immanis*)

Gamasus (*Eugamasus*) *kraepelini* = *Vulgarogamasus kraepelini* (Berlese, 1905)

1915, p. 51. (See also *Gamasus* (*Eugamasus*) *magnus*)

Gamasus (*Eugamasus*) *magnus* = *Vulgarogamasus kraepelini* (Berlese, 1905)

1915, p. 50. (See also *Gamasus* (*Eugamasus*) *kraepelini*)

Gamasus (*Eugamasus*) *trouessarti* = *Vulgarogamasus trouessarti* (Berlese, 1892)

1915, p. 51. (See also *Gamasus trouessarti*)

Gamasus (*Gamasus*) *coleopratorum* = *Parasitus coleopratorum* (Linnaeus, 1758)

1915, p. 50. (See also *Gamasus coleopratorum*)

Gamasus (*Gamasus*) *fimetorum* = *Parasitus fimetorum* (Berlese, 1904)

1915, p.49.

Gamasus (*Gamasus*) *kempersi* = *Parasitus kempersi* Oudemans, 1902

1915, p. 49. (See also *Gamasus kempersi*)

Gamasus (*Gamasus*) *lunaris* = *Cornigamasus lunaris* (Berlese, 1882)

1915, p. 50. (See also *Gamasus lunaris*)

Gamasus immanis = *Vulgarogamasus immanis* (Berlese, 1904)

1920, p. 119. (See also *Gamasus* (*Eugamasus*) *immanis*)

Bull. Ir. biogeog. Soc. No. 22

Gamasus kempersi = *Parasitus kempersi* Oudemans, 1902

1920, p. 118. (See also *Gamasus (Gamasus) kempersi*)

Gamasus lunaris = *Cornigamasus lunaris* (Berlese, 1882)

1920, p. 118 (wrongly ascribed here to Oudemans). (See also *Gamasus (Gamasus) lunaris*)

Gamasus (Ologamasus) calcaratus (partim.) = *Holoparasitus calcaratus* (C. L. Koch, 1839)

1915, p. 54.

Gamasus (Ologamasus) calcaratus (partim.) = *Holoparasitus inornatus* (Berlese, 1906)

1915, p. 54. (See also *Gamasus (Ologamasus) inornatus*)

Gamasus (Ologamasus) calcaratus var. *excisus* = *Holoparasitus stramenti* Karg, 1971

1915, p. 54. (See also *Gamasus (Ologamasus) pollicipatus*)

Gamasus (Ologamasus) inornatus = *Holoparasitus inornatus* (Berlese, 1906)

1915, p. 55. (See also *Gamasus (Ologamasus) calcaratus*)

Gamasus (Ologamasus) pollicipatus = *Holoparasitus stramenti* Karg, 1971

1915, p. 55. (See also *Gamasus (Ologamasus) calcaratus* var. *excisus*)

Gamasus (Pergamasus) alpestris = *Pergamasus alpestris* (Berlese, 1904)

1915, p. 52.

Gamasus (Pergamasus) crassipes = *Pergamasus crassipes* (Linnaeus, 1758)

1915, p. 54.

Gamasus (Pergamasus) crassipes var. *longicornis* = *Pergamasus longicornis* (Berlese, 1906)

1915, p. 54. (See also *Gamasus crassipes* var. *longicornis*)

**Gamasus (Pergamasus) diversus* = *Paragamasus diversus* (Halbert, 1915)

1915, p. 52. One slide in the Halbert collection labelled: *Pergamasus diversus* Halbt. Castlebar Lough July 1911 (shore of lake) Type Reg. 55-1923. Condition: poor.

Gamasus (Pergamasus) lapponicus = *Lysigamasus lapponicus* (Trägårdh, 1910)

1915, p. 53.

Gamasus (Pergamasus) parvulus = *Leptogamasus parvulus* (Berlese, 1903)

1915, p. 52. (See also *Gamasus (Pergamasus) parvulus* var. *dilatatellus*)

Gamasus (Pergamasus) parvulus var. *dilatatellus* = *Leptogamasus parvulus* (Berlese, 1903)

1915, p. 52. (See also *Gamasus (Pergamasus) parvulus*)

****Gamasus (Pergamasus) processiferus* = *Lysigamasus processiferus* (Halbert, 1915)**

1915, p. 53. Two slides in the Halbert collection (one of mouthparts). Labelled: Westport July 1911 Type *Pergamasus processiferus* Halbt. Reg.55-1923 Type. Condition: good.

***Gamasus (Pergamasus) robustus* = *Paragamasus robustus* (Oudemans, 1902)**

1915, p. 52.

***Gamasus (Pergamasus) runcatellus* = *Lysigamasus runcatellus* (Berlese, 1903)**

1915, p.51.

***Gamasus (Pergamasus) runciger* = *Lysigamasus runciger* (Berlese, 1904)**

1915, p. 51.

****Gamasus (Pergamasus) runciger* var. *armatus* = *Lysigamasus armatus* (Halbert, 1915)**

1915, p. 51. Two slides in the Halbert collection, one a male, the other mouthparts. Labelled: *Pergamasus runciger* var. *armatus* H. Malloranny rotten wood 27.9.1913 Type. Type *Gamasus (Pergamasus) runciger* B v. *armatus* Halbt. 55-1928. Mulranny Type 27.9.1913. Condition: poor.

***Gamasus trouessarti* = *Vulgarogamasus trouessarti* (Berlese, 1892)**

1920, p. 119. (See also *Gamasus (Eugamasus) trouessarti*)

****Halolaelaps celticus* Halbert, 1915**

1915, p. 57; 1920, p. 116. Two slides in the Halbert collection, one with mouthparts only, the other with three specimens. Labelled: *Halolaelaps celticus* Halbt. Howth S. shore Type Sep. 1913 Reg. 55-1923 J.N.H. Howth, under stones on shore. Condition: fair.

***Halolaelaps glabriusculus* = *Halolaelaps marinus* (Brady, 1875)**

1915, p. 56; 1920, p. 116.

***Haluropoda interrupta* = *Uropoda (Phaulodinychus) repletus* (Berlese, 1903)**

1915, p. 88. Described as a new species by Halbert (1915) but synonymy as noted. (See also *Haluropoda* in section A and *Phaulodinychus repletus* below)

***Haluropoda minor* = *Uropoda (Uropoda) halberti* Hirschmann, 1993**

1915, p. 90. Described as a new species by Halbert (1915) but newly named by Hirschmann (in Hirschmann and Wisniewski, 1993). (See also *Haluropoda* in section A and *Trachyuropoda minor* below)

Bull. Ir. biogeog. Soc. No. 22

Holostaspis longispinosus = *Geholaspis* (*Geholaspis*) *longispinosus* (Kramer, 1876)

1915, p. 66.

Holostaspis longulus = *Geholaspis* (*Longicheles*) *mandibularis* (Berlese, 1904)

1915, p. 66.

Holostaspis marginatus var. *littoralis* = *Macrocheles glaber* (Müller, 1860)

1915, p. 67. Described as a new variety by Halbert (1915) but true identity as noted. (See also *Macrocheles marginatus* var. *littoralis*)

Holostaspis terreus = *Macrocheles terreus* (Canestrini et Fanzago, 1877)

1915, p. 66.

Holostaspis tridentinus = *Macrocheles submotus* Falconer, 1923

1915, p. 66.

Hydrogamasus giardi (Berlese et Trouessart, 1889)

1915, p. 65; 1920, p. 121.

Hydrogamasus littoralis (G. et R. Canestrini, 1881)

1920, p. 120.

Laelaps agilis C. L. Koch, 1836

1923, p. 367. (See also *Laelaps* (*Eulaelaps*) *agilis*)

Laelaps (*Cosmolaelaps*) *claviger* = *Cosmolaelaps claviger* (Berlese, 1883)

1915, p. 73.

Laeleps [sic !] (*Cosmolaelaps*) *styliferus* = *Cosmolaelaps vacua* (Michael, 1891)

1915, p. 73. Described as a new species by Halbert (1915) but synonymy as noted. (See also *Laelaps* (*Cosmolaelaps*) *vacuus*)

Laelaps (*Cosmolaelaps*) *vacuus* = *Cosmolaelaps vacua* (Michael, 1891)

1915, p. 72. (See also *Laelaps* (*Cosmolaelaps*) *styliferus*)

Laelaps dentatus = *Pseudoparasitus ovatulus* (Halbert, 1915) syn. nov.

1920, p. 123. Described as a new species by Halbert (1920) but new synonymy as noted. (See also *Laelaps* (*Hypoaspis*) *ovatulus*)

Laelaps (*Eulaelaps*) *agilis* = *Laelaps agilis* C. L. Koch, 1836

1915, p. 69. (See also *Laelaps agilis*)

Bull. Ir. biogeog. Soc. No. 22

Laelaps (Eulaelaps) stabularis = *Eulaelaps stabularis* (C. L. Koch, 1836)

1915, p. 69. (See also *Laelaps stabularis* [sic !])

Laelaps fimbriatus = *Blattisocius dentriticus* (Berlese, 1918)

1923, p. 368. Described as a new species by Halbert (1923) but synonymy as noted.

Laelaps (Hypoaspis) acutus = *Hypoaspis (Alloparasitus) acuta* (Michael, 1891)

1915, p. 71.

Laelaps (Hypoaspis) longipes = *Haemogamasus pontiger* (Berlese, 1904)

1915, p. 72. Described as a new species by Halbert (1915) but synonymy as noted. Evans and Till (1966) suggested that the species was possibly synonymous with *Haemogamasus horridus*. Examination of the specimen reveals that its synonymy is as above.

**Laelaps (Hypoaspis) oblongus* = *Hypoaspis (Alloparasitus) oblongus* (Halbert, 1915)

1915, p. 70. Two slides in the Halbert collection, one a female, the other mouthparts. Labelled: (female) *Laelaps oblongus* Halbt Westport under bark July 1911 Type *Laelaps (Hypoaspis) oblongus* Hlbt Reg. 55-1923; (mouthparts) *Laelaps oblongus* H. Mallaranny (although Westport demesne in publication) July '11 Type J.N.H. *Laelaps (Hypoaspis) oblongus* (mouthparts) Type Reg.55-1923. Condition of both: excellent.

Laelaps (Hypoaspis) ovatulus = *Pseudoparasitus ovatulus* (Halbert, 1915)

1915, p. 71. Two slides in the Halbert collection, one with a female specimen, the other with mouthparts. The first slide has two labels: *Laelaps (Hypoaspis) ovatulus* Hlbt. Mulranny 9.1913 Type Reg.55-1923, and *Laelaps ovatulus* ♀ Halbt Mulranny sandhills September Type. The specimen is not in good condition. The second slide also has two labels: *Laelaps ovatulus* Halbt (capitulum +c) Mulranny sandhills 26.9.1913 Type, and *Laelaps ovatulus* Halbt (Hypoaspis) Mulranny sandhills 9/(?) '13 Type Reg. 55-1923. The condition of this material is good. Evans and Till (1966) were the first to note that this taxon was referable to the genus *Pseudoparasitus* and Halbert's (1915) figure makes this clear. Comparison of the figures of "*Laelaps (Hypoaspis) ovatulus*" and "*Laelaps dentatus*" suggests that there is only one real difference between the two which is that the peritrematal shields are fused with the exopodal shields at the level of coxae IV in the former. Although the extant specimen of *ovatulus* is in poor condition, it does not appear on examination that this feature has been correctly recorded, i.e. there is no such fusion. Comparison of type specimens of the two taxa reveal that all their character states

are equivalent and the conclusion must be drawn that they are synonymous. The name *dentatus* is junior to that of *ovatus* and must, therefore, be relegated. (See also *Laelaps dentatus*)

Laelaps (Iphis) aculeifer = *Hypoaspis (Gaeolaelaps) aculeifer* (Canestrini, 1884)
1923, p. 367.

Laelaps (Ololaelaps) confinis = *Ololaelaps placentula* (Berlese, 1887)
1915, p. 70.

Laelaps (Ololaelaps) tumidulus = *Ololaelaps veneta* (Berlese, 1903)
1915, p. 70.

Laelaps (Ololaelaps) montanus = *Holostaspis montana* (Berlese, 1904)
1915, p. 73.

Laelaps (Pseudoparasitus) meridionalis = *Pseudoparasitus meridionalis* (G. et R. Canestrini, 1882)
1915, p. 70.

Laelaps stabulasis [sic !] = *Eulaelaps stabularis* (C. L. Koch, 1836)
1923, p. 367. (See also *Laelaps (Eulaelaps) stabularis*)

**Lasioseius (Episeius) glaber var. curtipes* = *Cheiroseius curtipes* (Halbert, 1923)
1923, p. 370. One slide in the Halbert collection labelled: *Lasioseius* (Ep.) *glaber* Berl. var. *curtipes* Halbt. Lambay Island July Type J.N.H. and containing one female. Condition: fair.

Lasioseius (Episeius) italicus = *Platyseius italicus* (Berlese, 1905)
1923, p. 371. (See also *Lasioseius (Episeius) michaeli*, L. (E.) *tenuipes*, *Paraseius italicus* and *P. tenuipes*)

**Lasioseius (Episeius) major* = *Platyseius major* (Halbert, 1923)
1923, p. 371. Three slides in the Halbert collection labelled: (1) *Lasios. (Episeius) major* Halbt. (Jaws) K'mashogue Dublin Dec. '21 J.H [sic !]. H.; (2) *Lasious* [sic !] *major* (Halbert) river Tolka Glasnevin Co Dublin 6.22 J.N.H. (Six females redesignated as *Plesiosejus major* by K. H. Hyatt 1959); (3) (No original designation label) *Plesiosejus major* (Hlbt) ♂, ♀. Mill Bay Lands end England M. [sic !] D. Michael 11.92 (Redesignated by K. H. Hyatt 1959). Condition of all: good.

Lasioseius (Episeius) michaeli = *Platyseius italicus* (Berlese, 1905)
1923, p. 371. Described as a new species by Halbert (1923) but synonymy as noted. (See also

Bull. Ir. biogeog. Soc. No. 22

Lasioseius (Episeius) italicus, L. (E.) *tenuipes*, *Paraseius italicus* and *P. tenuipes*)

Lasioseius (Episeius) sphagni = *Cheiroseius laelaptoides* (Berlese, 1887)

1923, p. 371. Described as a new species by Halbert (1923) but synonymy as noted. (See also

Lasioseius (Lasioseius) laelaptoides)

Lasioseius (Episeius) tenuipes = *Platyseius italicus* (Berlese, 1905)

1923, p. 371. (See also *Lasioseius (Episeius) italicus*, L. (E.) *michaeli*, *Paraseius italicus* and *P. tenuipes*)

**Lasioseius fucicola* = *Thinoseius fucicola* (Halbert, 1920)

1920, p. 125. Evans and Browning (1953) pointed out that this species is the male of *Thinoseius berlesei* Halbert, 1920. On the basis of page priority *T. berlesei* became the junior synonym of the species. The first type slide in the Halbert collection is a gift from A. D. Michael labelled: Swanage shore. Two species Acarina Gamasidae A.D.Michael *Lasioseius fucicola* Halbt and *Thinoseius Berlesii* Halbt Types Reg. 58-1923 R (?) 368. These specimens are, in fact, the male and female of the same species (*Thinoseius fucicola*) and are in excellent condition. There is also a second slide labelled: *Thinoseius* n.gen. et n.sp. *Berlesii* Malahide rocky shore B.T.27 (1.7.'15) Type Reg.58-1923. Condition: good. (See also *Thinoseius* in section A, and *Thinoseius berlesei* below)

**Lasioseius (Lasioseius) gracilis* = *Kleemannia gracilis* (Halbert, 1923)

1923, p. 369. No specimens of this species are to be found in the Halbert collection.

Lasioseius (Lasioseius) laelaptoides = *Cheiroseius laelaptoides* (Berlese, 1887)

1923, p. 370. (See also *Lasioseius (Episeius) sphagni*)

**Lasioseius (Leioseius) minutus* = *Iphidozercon minutus* (Halbert, 1915)

1923, p. 374. One slide in the Halbert collection labelled: *Seiulus minutus* Halbt. Clare Is. VIII - 1912 Mayo Sphagnum Type Reg.55-1923. Condition: fair. (See also *Seiulus minutus*)

**Lasioseius (Leioseius) salinus* = *Leioseius salinus* (Halbert, 1920)

1920, p. 125. One slide in the Halbert collection (mouthparts under one coverslip, the remainder of the female body under another). Labelled: Type Reg.58-1923 *Lasioseius salinus* ♀ n.sp. Malahide 30.v.1915. Condition: good. (See also *Lasioseius salinus*)

Lasioseius ometes (Oudemans, 1903)

1923, p. 370.

Lasioseius (Platyseius) subglaber = *Platyseius subglaber* (Oudemans, 1903)
1923, p. 373.

Lasioseius salinus = *Leioseius salinus* (Halbert, 1920)
1920, p. 125. (See also *Lasioseius (Leioseius) salinus*)

Macrocheles marginatus var. *littoralis* = *Macrocheles glaber* (Müller, 1860)
1920, p. 122. (See also *Holostaspis marginatus* var. *littoralis*)

Macrocheles vagabundus = *Glyphtholaspis americana* (Berlese, 1888)
1923, p. 366.

Myonyssus decumani Tiraboschi, 1904
1923, p. 367.

**Pachylaelaps littoralis* Halbert, 1915
1915, p. 64; 1920, p. 122. Two slides in the Halbert collection, one a male and the other (labelled "littorale") mouthparts. Labelled: Mallaranny 28.9.1913 Bellacragher B between tide marks. Condition: fair.

**Pachylaelaps longisetis* Halbert, 1915
1915, p. 65. Two slides in the Halbert collection, one a female, the other mouthparts. Labelled: Achill Id. 11/'13 tree trunks Type Reg.55-23 rotten wood 1/11/1913. Condition: fair.

**Pachylaelaps pectinifer* var. *magnus* = *Pachylaelaps magnus* (Halbert, 1915)
1915, p. 63. Two slides in the Halbert collection, one a female and one mouthparts. Labelled: *Pachylaelaps pectinifer* Can. v. *magnus* Hbt. Westport 7/1911 Type Reg.55-1923. Condition: good.

Paraseius italicus = *Platyseius italicus* (Berlese, 1905)
1915, p. 77. (See also *Lasioseius (Episeius) italicus*, *L. (E.) michaeli*, *L. (E.) tenuipes* and *Paraseius tenuipes*)

**Paraseius serratus* = *Cheiroseius serratus* (Halbert, 1915)
1915, p. 78. Three slides in the Halbert collection. Labelled: (1) *Sejus serratus* (Halbert) (examined by K. H. Hyatt 1959) moss Conaghadus Co. Dublin 8.28. J.N.H. Condition: poor; (2) *Lasioseius serratus* Halbert Type Reg.55-1923 *Ameroseius serratus* Halbt. Croaghpatrick 600 ft (L. ?) Sphagnum 10/1911. This contains four females and is in excellent condition; (3) (examined by Hyatt 1959) Malahide Co Dublin 4.39. J.N.H. It contains five females

Bull. Ir. biogeog. Soc. No. 22

and is in good condition. Evans and Hyatt (1960) redescribed "*Sejus serratus*". Even though Hyatt examined some of Halbert's type slides of the taxon the new description was probably based on Natural History Museum, London, material since Karg (1993) has pointed out that their "*serratus*" is in fact *Cheiroseius mutilus* (Berlese, 1916).

Paraseius tenuipes = *Platyseius italicus* (Berlese, 1905)

1915, p. 78. Described as a new species by Halbert (1915) but synonymy as noted. (See also *Lasioseius* (*Episeius*) *italicus*, L. (E.) *microphallus*, L. (E.) *tenuipes* and *Paraseius italicus*)

Phaulocylliba berleseï = *Uropoda* (*Phaulodinychus*) *littoralis* (Trouessart, 1902)

1915, p. 86. Described as a new species by Halbert (1915) but synonymy as noted. (See also *Phaulocylliba littoralis*)

Phaulocylliba littoralis = *Uropoda* (*Phaulodinychus*) *littoralis* (Trouessart, 1902)

1920, p. 129. (See also *Phaulocylliba berleseï*)

Phaulodinychus repletus = *Uropoda* (*Phaulodinychus*) *repletus* (Berlese, 1903)

1920, p. 129. (See also *Haluropoda interrupta*)

Phaulodinychus orchestrædarium = *Uropoda* (*Phaulodinychus*) *orchestrædarium* (Barrois, 1887)

1920, p. 130.

Polyaspinus cylindricus Berlese, 1916

1923, p. 376.

Rhodacarus roseus Oudemans, 1902

1920, p. 115.

Rhodacarus roseus var. *pallidus* = *Rhodacarus pallidus* Hull, 1917

1920, p. 115.

Seiulus hirsutus = *Ameroseius corbiculus* (Sowerby, 1806)

1915, p. 77.

Seiulus levis = *Neojordensia levis* (Oudemans et Voigts, 1904)

1915, p. 76.

Seiulus minutus = *Iphidozercon minutus* (Halbert, 1915)

1915, p. 76. (See also *Lasioseius* (*Leioseius*) *minutus*)

Seiulus muricatus = *Lasioseius muricatus* (C. L. Koch, 1839)

1915, p. 77.

Bull. Ir. biogeog. Soc. No. 22

Seiulus remiger = *Zerconopsis remiger* (Kramer, 1876)

1915, p. 75.

Seiulus spathuliger = *Zercoseiulus spathuliger* (Leonardi, 1899)

1915, p. 74.

Seius togatus = *Sejus togatus* C. L. Koch, 1836

1923, p. 374.

Thinoseiulus berlessei = *Thinoseiulus fucicola* (Halbert, 1920)

1920, p. 127. (See also *Thinoseiulus* in section A, and *Lasioseiulus fucicola* above)

****Thinozercon michaeli* Halbert, 1915**

1915, p. 82; 1920, p. 128. The slides in the Halbert collection are in very poor condition.

There are four of them, one (a nymph) is labelled: Westport shore July 1911. (See also

Thinozerconidae and *Thinozercon* in section A)

Trachytes pi var. *pauperior* = *Trachytes pauperior* (Berlese, 1914)

1923, p. 377.

Trachytes piriformis (Kramer, 1876)

1923, p. 376.

****Trachyuropoda celtica* Halbert, 1907**

1907, p. 67. No specimens of this species are to be found in the Halbert collection. (See also

Trachyuropoda troguloides var. *celtica*)

Trachyuropoda coccinea (Michael, 1891)

1915, p. 93.

Trachyuropoda coccinea var. *sinuata* = *Trachyuropoda sinuata* (Berlese, 1904)

1915, p. 93.

Trachyuropoda (Dinycura) cordieri = *Discourella cordieri* (Berlese, 1916)

1923, p. 378.

Trachyuropoda lamellosa = *Trachyuropoda troguloides* (Canestrini et Fanzago, 1877)

1915, p. 93.

Trachyuropoda minor = *Uropoda (Uropoda) halberti* Hirschmann, 1993

1920, p. 130. (See also *Haluropoda* in section A and *Haluropoda minor* above)

Bull. Ir. biogeog. Soc. No. 22

- Trachyuropoda troguloides* var. *celtica* = *Trachyuropoda celtica* Halbert, 1907
1923, p. 378. Described as *Trachyuropoda celtica* by Halbert (1907). Halbert subsequently accepted Berlese's view that the taxon was of variety status only and published this opinion in 1923. Current thinking restores Halbert's original belief. (See also *Trachyuropoda celtica*)
- Urodinychus campomolendina* = *Trichouropoda campomolendina* (Berlese, 1887)
1915, p. 92.
- **Urodinychus punctatissimus* = *Trichouropoda punctatissima* (Halbert, 1915)
1915, p. 92. One slide in the Halbert collection labelled: *Urodinychus punctatissimus* Halbt
Achill Id 1.11.1913 Type Reg.55-1923 moss. Condition: good.
- Urodiscella philoctena* = *Oplitis philoctena* (Trouessart, 1902)
1915, p. 92.
- Uroobovella notabilis* Berlese, 1903
1915, p. 91.
- Uropoda obscura* = *Trichouropoda obscura* (C. L. Koch, 1836)
1915, p. 91; 1923, p. 377.
- Uroseius acuminatus* = *Uroseius (Uroseius) acuminatus* (C. L. Koch, 1847)
1923, p. 377.
- Urotrachytes formicarius* = *Trachyuropoda formicaria* (Lubbock, 1881)
1907, p. 66; 1915, p. 93.
- Zercon perforatulus* Berlese, 1903
1923, p. 375.
- **Zercon tragardhi* = *Prozercon traegardhi* (Halbert, 1923)
1923, p. 375. No specimens of this species are to be found in the Halbert collection.
- Zercon triangularis* C. L. Koch, 1836
1915, p. 79.
- Zercon trigonus* = *Prozercon fimbriatus* (C. L. Koch, 1839)
1915, p. 80.

Species incertae sedis

Cilliba vegetans (= *Gamasus vegetans* ?Dugès)

1915, p. 86. This has also been recorded in the literature of the British Isles by Michael (1894) (as *Uropoda vegetans*) and Falconer (1914). According to Turk (1953) the species is the type of "*Pseudouropoda*" (= *Trichouropoda*). Hull (1917) says: "The name, I suppose, is taken from Oudemans who is inclined to be arbitrary in such matters. As a matter of fact, there is no such species; Dugès writes "*vegetans* Latreille" and gives no figure nor any specific character". Hull thinks that the records might actually refer to *Uroseius* (*Uroseius*) *acuminatus*. We shall never know the true identity of this taxon and there are no specimens in the Halbert collection with which to resolve his interpretation.

Cillibano (= *Cilliba*) *dinychoides* Hull, 1917

1923, p. 379. This species is not listed in Karg (1989) and is noted as "incertae sedis" by Hirschmann and Wisniewski (1993). Hull's specimens are lost and his description is inadequate for placement. No specimens are to be found in the Halbert collection.

Episeius grandis (= *Lasioseius grandis* Berlese, 1916)

1920, p. 124. Evans and Hyatt (1960) considered this species to belong to the genus *Cheiroseius* but were not able to confirm their opinion in the absence of specimens. Unfortunately, Halbert's material is no longer in the collections of the Natural History Museum.

Gamasellus (*Protolaelaps*) *subnudus* Berlese, 1918

1923, p. 365. This species does not feature in recent literature and cannot be placed with any confidence. No specimens are to be found in the Halbert collection and even his record is published "with some reserve".

Laelaps latisternus Halbert, 1923

1923, p. 367. The specimen in the Halbert collection lies beneath the cracked ringing medium and is in such poor condition that it would be worthless for study even if remounted. The species is not mentioned in Evans and Till (1966) and it is not possible to place it from Halbert's description and figure.

Laelaps simplex Halbert, 1923

1923, p. 368. No specimen exists in the Halbert collection and it is not possible to place it

from Halbert's description and figure. It is not mentioned in Evans and Till (1966).

Phaulocylliba virgata = *Cillibano* (= *Cilliba*) *virgata* Hull, 1917

1923, p. 377. Not recorded by Karg (1989) and noted as "incertae sedis" by Hirschmann and Wisniewski (1993). There are no specimens in the Halbert collection.

Uropoda tecta (= *Urodiaspis tecta*) = *Urodiaspis persimilis* Hull, 1925

1915, p. 91. Halbert listed the species *Uropoda tecta* in good faith, probably as the result of correspondence with Hull, but there is no evidence that he either collected or examined specimens himself. None are to be found in the Halbert collection. Hull recorded the species (from Co. Wicklow and elsewhere) as *Urodinychus tectus* in 1917. Subsequently (1925) he modified his view and described the material as a new species, *Urodiaspis persimilis*. This taxon does not feature in Karg (1989) and is listed as "incertae sedis" by Hirschmann and Wisniewski (1993). In view of the confusion it is probably better to omit this species for the time being from the Irish list.

Urodinychus ovalis (C. L. Koch, 1839) var. *thorianus* Berlese, 1903

1915, p. 91. No specimens exist in the Halbert collection and the variety is not mentioned in Karg (1989) or in Hirschmann and Wisniewski (1993). Since nothing is known of this variety, or of its relationship with its species, it is probably better to omit it for the time being from the Irish list.

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TABLE 1. Comparative summary.

	Total for British Isles	Total for Ireland	Irish fauna as % of that for the British Isles
A. Oribatida			
Genera	135	93	69
Species	305	163	53

Number of species recorded for the British Isles but confined to Ireland = 20 (7%).

B. Parasitiformes

Genera	151	104	69
Species	488	235	48

Number of species recorded for the British Isles but confined to Ireland = 35 (7%).

APPENDIX 1. Check list of the oribatid mites of Ireland.

Asterisks indicate that, within the British Isles, the taxon is thus far recorded only for Ireland.
The numbers in square brackets relate to citations in the reference list.

Cohort PALAEOSOMATA

Superfamily PALAEACAROIDEA Grandjean, 1932

Family ADELPHACARIDAE Grandjean, 1954

Genus *Aphelacarus* Grandjean, 1932

unidentified species [42]

Cohort ENARTHRONOTA

Superfamily BRACHYCHTHONIOIDEA Thor, 1934

Family BRACHYCHTHONIIDAE Thor, 1934

Genus *Brachychthonius* Berlese, 1910

berlesei Willmann, 1928 [26, 37, 39, 40, 42]

bimaculatus Willmann, 1936 [26, 34]

Genus *Liochthonius* van der Hammen, 1959

brevis (Michael, 1888) [11, 26, 42, 44, 66]

horridus (Sellnick, 1928) * [26, 42]

hystricinus (Forsslund, 1942) * [66]

lapponicus (Trägårdh, 1910) [26]

leptaleus Moritz, 1976 [26]

muscorum Forsslund, 1964 * [26]

sellnicki (Thor, 1930) [26, 37, 42, 96, 97, 98]

simplex (Forsslund, 1942) [66]

Genus *Neoliochthonius* Lee, 1982

piluliferus (Forsslund, 1942) [26, 42]

Genus *Sellnickochthonius* Krivolutsky, 1964

cricoides (Weis-Fogh, 1948) [26, 37]

furcatus (Weis-Fogh, 1948) * [66]

Bull. Ir. biogeog. Soc. No. 22

hungaricus (J. Balogh, 1943) [26, 33]

immaculatus (Forsslund, 1942) [26, 34, 66]

jacoti (Evans, 1952) [26, 66]

suecicus (Forsslund, 1942) [26]

zelawaiensis (Sellnick, 1928) [42]

Superfamily HYPOCHTHONIOIDEA Berlese, 1910

Family HYPOCHTHONIIDAE Berlese, 1910

Genus *Hypochthonius* C. L. Koch, 1835

luteus Oudemans, 1917 [47]

rufulus C. L. Koch, 1835 [11, 31, 42]

Superfamily PROTOPLOPHOROIDEA Ewing, 1917

Family COSMOCHTHONIIDAE Grandjean, 1947

Genus *Cosmochthonius* Berlese, 1910

lanatus (Michael, 1885) [50]

Cohort MIXONOMATA

Superfamily EUPHTHRACAROIDEA Jacot, 1930

Family EUPHTHRACARIDAE Jacot, 1930

Genus *Rhysotritia* Märkel et Meyer, 1959

?duplicata (Grandjean, 1953) [11]

Superfamily PERLOHMANNIOIDEA Grandjean, 1954

Family PERLOHMANNIIDAE Grandjean, 1954

Genus *Perlohmanna* Berlese, 1916

insignis (Berlese, 1904) * [11, 35, 36, 67, 70, 95]

Superfamily PHTHRACAROIDEA Perty, 1841

Family PHTHRACARIDAE Perty, 1841

Genus *Atropacarus* Ewing, 1917

striculus (C. L. Koch, 1835) [37, 47, 78]

Genus *Hoplophorella* Berlese, 1923 *

unidentified species [47]

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Genus *Phthiracarus* Perty, 1841

affinis (Hull, 1914) [85]

anonymus Grandjean, 1933 [26, 85]

?clavatus Parry, 1979 [10, 11]

membranifer Parry, 1979 [66]

Genus *Steganacarus* Ewing, 1917

magnus (Nicolet, 1855) [10, 11, 26, 31, 47, 66]

Cohort DESMONOMATA

Superfamily CROTONIOIDEA Thorell, 1876

Family CAMISIIDAE Oudemans, 1900

Genus *Camisia* von Heyden, 1826

biurus (C. L. Koch, 1839) [11]

horrida (Hermann, 1804) [10, 11]

invenusta (Michael, 1888) [11, 12, 65]

segnis (Hermann, 1804) [11, 31, 82, 83]

spinifer (C. L. Koch, 1835) [10, 11]

Genus *Platynothrus* Berlese, 1913

peltifer (C. L. Koch, 1839) [10, 11, 26, 27, 31, 37, 42, 96, 97, 98]

Family MALACONOTHRIDAE Berlese, 1916

Genus *Malaconothrus* Berlese, 1904

monodactylus (Michael, 1888) [11, 31, 80]

processus van der Hammen, 1952 [80]

punctulatus van der Hammen, 1952 [26]

purvisi Luxton, 1987 * [80]

Genus *Trimalaconothrus* Berlese, 1916

glaber (Michael, 1888) [11]

tardus (Michael, 1888) [11]

Family NOTHRIDAE Berlese, 1896

Genus *Nothrus* C. L. Koch, 1835

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palustris C. L. Koch, 1839 [11, 37]

silvestris Nicolet, 1855 [11, 31]

Superfamily HERMANNIOIDEA Sellnick, 1928

Family HERMANNIIDAE Sellnick, 1928

Genus *Hermannia* Nicolet, 1855

convexa (C. L. Koch, 1839) [11]

gibba (C. L. Koch, 1839) [10]

pulchella Willmann, 1952 [100]

reticulata Thorell, 1871 [10, 11, 12]

scabra (L. Koch, 1879) [11, 12, 26, 65]

Superfamily NANHERMANNIOIDEA Sellnick, 1928

Family NANHERMANNIIDAE Sellnick, 1928

Genus *Nanhermannia* Berlese, 1913

coronata Berlese, 1913 [27]

elegantula Berlese, 1913 [37]

nana (Nicolet, 1855) [10, 11, 26, 31, 42, 98]

Cohort BRACHYPYLINA

Superfamily AMEROBELBOIDEA Grandjean, 1954

Family CTENOBELBIDAE Grandjean, 1965

Genus *Ctenobelba* J. Balogh, 1943

obsoleta (C. L. Koch, 1841) [13]

Superfamily AMERONOTHROIDEA Willmann, 1931

Family AMERONOTHRIDAE Willmann, 1931

Genus *Ameronothrus* Berlese, 1896

lineatus (Thorell, 1871) [11, 12]

maculatus (Michael, 1882) [10, 11, 12, 65]

Genus *Hygroribates* Jacot, 1934

bilineatus (Michael, 1888) [11, 12, 65]

marinus (Banks, 1896) [12, 65]

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Family CYMBAEREMAEIDAE Sellnick, 1928

Genus *Scapheremaeus* Berlese, 1910 *

palustris Sellnick, 1924 * [50]

Family MICREREMIDAE Grandjean, 1954

Genus *Micreremus* Berlese, 1908

brevipes (Michael, 1888) [82, 83]

Superfamily CARABODOIDEA C. L. Koch, 1837

Family CARABODIDAE C. L. Koch, 1837

Genus *Carabodes* C. L. Koch, 1835

affinis Berlese, 1913 * [11, 13]

labyrinthicus (Michael, 1879) [10, 11]

marginatus (Michael, 1884) [27]

willmanni Bernini, 1975 [31]

Genus *Odontocepheus* Berlese, 1913

elongatus (Michael, 1879) [11]

Family TECTOCEPHEIDAE Grandjean, 1954

Genus *Tectocepheus* Berlese, 1896

velatus (Michael, 1880) [26, 33, 34, 47, 48, 79, 96, 97, 98]

Superfamily CEPHEOIDEA Berlese, 1896

Family CEPHEIDAE Berlese, 1896

Genus *Cepheus* C. L. Koch, 1835

latus C. L. Koch, 1835 [11]

Genus *Conoppia* Berlese, 1908

palmicinctum (Michael, 1880) [13]

Genus *Tritegeus* Berlese, 1913

bisulcatus Grandjean, 1953 [11]

Superfamily DAMAEOIDEA Berlese, 1896

Family DAMAEIDAE Berlese, 1896

Genus *Damaeus* C. L. Koch, 1835

Subgenus *Adamaeus* Norton, 1977

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onustus (C. L. Koch, 1841) [10, 11]

Subgenus *Paradamaeus* Bulanova-Zachvatkina, 1957

clavipes (Hermann, 1804) [10, 11, 26, 41, 66]

Genus *Epidamaeus* Bulanova-Zachvatkina, 1957

unidentified species [66]

Genus *Metabelba* Grandjean, 1936

papillipes (Nicolet, 1855) [11, 37]

Superfamily EREMAEOIDEA Sellnick, 1928

Family EREMAEIDAE Sellnick, 1928

Genus *Eremaeus* C. L. Koch, 1835

oblongus C. L. Koch, 1835 [11, 82]

Superfamily GUSTAVIOIDEA Oudemans, 1900

Family CERATOPPIIDAE Kunst, 1971

Genus *Ceratoppia* Berlese, 1908

bipilis (Hermann, 1804) [10, 11, 26, 27, 31, 37, 42]

Family LIACARIDAE Sellnick, 1928

Genus *Adoristes* Hull, 1916

ovatus (C. L. Koch, 1839) [11]

poppei (Oudemans, 1906) [26]

Genus *Liacarus* Michael, 1898

coracinus (C. L. Koch, 1839) [11]

xylariae (Schränk, 1803) [37]

Genus *Xenillus* Robineau-Desvoidy, 1839

tegeocranus (Hermann, 1804) [10, 11, 26, 42]

Superfamily HERMANNIELLOIDEA Grandjean, 1934

Family HERMANNIELLIDAE Grandjean, 1934

Genus *Hermanniella* Berlese, 1908

picea (C. L. Koch, 1839) [13]

Superfamily HYDROZETOIDEA Grandjean, 1954

Family HYDROZETIDAE Grandjean, 1954

Bull. Ir. biogeog. Soc. No. 22

Genus *Hydrozetes* Berlese, 1902

lacustris (Michael, 1882) [11]

Family LIMNOZETIDAE Grandjean, 1954

Genus *Limnozetes* Hull, 1916

ciliatus (Schränk, 1803) [31]

rugosus (Sellnick, 1923) * [11, 42]

Superfamily LIODOIDEA Grandjean, 1954

Family LIODIDAE Grandjean, 1954

Genus *Neoliodes* Berlese, 1888

theleproctus (Hermann, 1804) [10]

Genus *Poroliodes* Grandjean, 1934

farinosus (C. L. Koch, 1839) [11]

Superfamily OPPIOIDEA Grandjean, 1951

Family CALEREMAEIDAE Grandjean, 1965

Genus *Caleremaeus* Berlese, 1910

monilipes (Michael, 1882) [13]

Family OPPIIDAE Grandjean, 1951

Genus *Berniniella* J. Balogh, 1983

bicarinata (Paoli, 1908) [37, 38]

serratirostris (Golosova, 1970) * [26]

Genus *Dissorhina* Hull, 1916

ornata (Oudemans, 1900) [11, 26, 37, 42, 47, 66]

Genus *Medioppia* Subias et Minguez, 1985

obsoleta (Paoli, 1908) [26, 37, 42, 66]

Genus *Micropopia* J. Balogh, 1983

minus (Paoli, 1908) [37, 39, 42]

minutissima (Sellnick, 1950) * [26]

Genus *Moritzoppia* Subias et Rodriguez, 1987

oreia Colloff et Seyd, 1991 [27]

Genus *Multioppia* Hammer, 1961

Bull. Ir. biogeog. Soc. No. 22

excisa Moritz, 1971 * [26]

Genus *Oppia* C. L. Koch, 1835

nitens C. L. Koch, 1835 [50]

Genus *Oppiella* Jacot, 1937

nova (Oudemans, 1902) [26, 34, 37, 42, 66, 96, 97, 98]

Genus *Quadroppia* Jacot, 1939

quadricarinata (Michael, 1885) [26, 33]

Genus *Ramusella* Hammer, 1962

clavipectinata (Michael, 1885) [11, 26, 34, 37, 38, 39, 41, 42, 44, 46, 47, 83, 86, 96, 97, 98]

Genus *Serratoppia* Subias et Minguez, 1985 *

duffy (Evans, 1954) * [55]

Genus ?*Subiasella* J. Balogh, 1983

lamellata (Halbert, 1923) * [13]

Family SUCTOBELBIDAE Grandjean, 1954

Genus *Suctobelba* Paoli, 1908

trigona (Michael, 1888) [11]

Genus *Suctobelbella* Jacot, 1937

acutidens (Forsslund, 1941) [26, 37]

falcata (Forsslund, 1941) [26]

?*nasalis* (Forsslund, 1941) [42]

sarekensis (Forsslund, 1941) [37, 42]

subcornigera (Forsslund, 1941) [26, 44]

Family THYRISOMIDAE Grandjean, 1954

Genus *Banksinoma* Oudemans, 1930

lanceolata (Michael, 1885) [11, 26, 27, 37, 38, 42, 98]

Genus *Pantelozetes* Grandjean, 1953

multidentata (Evans, 1954) * [26]

paolii (Oudemans, 1913) [34, 37, 42, 79, 86]

Bull. Ir. biogeog. Soc. No. 22

Cohort PORONOTA

Superfamily CERATOZETOIDEA Jacot, 1925

Family CERATOZETIDAE Jacot, 1925

Genus *Ceratozetes* Berlese, 1908

gracilis (Michael, 1884) [11, 47]

mediocris Berlese, 1908 [26]

Genus *Diapterobates* Grandjean, 1936

humeralis (Hermann, 1804) [42]

Genus *Edwardzetes* Berlese, 1914

edwardsi (Nicolet, 1855) [11, 27]

Genus *Fuscozetes* Sellnick, 1928

fuscipes (C. L. Koch, 1844) [11]

Genus *Humerobates* Sellnick, 1928

rostromellatus Grandjean, 1936 [82, 83]

Genus *Latilamellobates* Shaldybina, 1971

incisellus (Kramer, 1897) [26, 37, 42, 43, 86, 87]

Genus *Melanozetes* Hull, 1916

mollicomus (C. L. Koch, 1839) [11, 27]

stagnatilis (Hull, 1914) [11]

Genus *Sphaerozetes* Berlese, 1885

orbicularis (C. L. Koch, 1835) [11]

piriformis (Nicolet, 1855) [11]

Genus *Trichoribates* Berlese, 1910

novus (Sellnick, 1928) [50, 94]

trimaculatus (C. L. Koch, 1835) [10, 11, 12, 65]

Family CHAMOBATIDAE Grandjean, 1954

Genus *Chamobates* Hull, 1916

cuspidatus (Michael, 1884) [11, 42, 82]

pusillus (Berlese, 1895) [26, 37, 41, 50]

schuetzi (Oudemans, 1902) [27, 31, 42]

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subglobulus (Oudemans, 1900) [10, 11]

Family EUZETIDAE Grandjean, 1954

Genus *Euzetes* Berlese, 1908

nitens (Johnston, 1853) [10, 11, 41]

Family MYCOBATIDAE Grandjean, 1954

Genus *Minunthozetes* Hull, 1916

semirufus (C. L. Koch, 1841) [11, 26, 37, 38, 39, 40, 41, 42, 43, 96, 97, 98]

Genus *Mycobates* Hull, 1916

parmeliae (Michael, 1884) [11, 12, 65]

sarekensis (Trägårdh, 1910) [27]

Genus *Punctoribates* Berlese, 1908

punctum (C. L. Koch, 1839) [12, 26, 31, 37, 42, 44, 47, 48, 65, 79, 86, 87]

quadrivertex (Halbert, 1920) [12]

Superfamily GALUMNOIDEA Jacot, 1925

Family GALUMNIDAE Jacot, 1925

Genus *Acrogalumna* Grandjean, 1956

longipluma (Berlese, 1904) [11]

Genus *Pergalumna* Grandjean, 1936

nervosa (Berlese, 1914) [11]

Superfamily LICNEREMAEOIDEA Grandjean, 1931

Family PASSALAZETIDAE Grandjean, 1954

Genus *Passalozetes* Grandjean, 1932

perforatus (Berlese, 1910) * [12, 65, 99]

Family SCUTOVERTICIDAE Grandjean, 1954

Genus *Scutovertex* Michael, 1879

minutus (C. L. Koch, 1835) [26]

sculptus Michael, 1879 [11]

Superfamily ORIBATELLOIDEA Jacot, 1925

Family ACHIPTERIIDAE Thor, 1929

Genus *Achipteria* Berlese, 1885

Bull. Ir. biogeog. Soc. No. 22

coleoprata (Linnaeus, 1758) [26, 37, 38, 39, 41, 42, 43, 96, 97, 98]

Genus *Parachipteria* van der Hammen, 1952

nicoleti (Berlese, 1883) [26, 31, 37]

?punctata (Nicolet, 1855) [10, 11]

Genus *Pseudachipteria* Travé, 1960

magna (Sellnick, 1928) [27, 88]

Family ORIBATELLIDAE Jacot, 1925

Genus *Oribatella* Banks, 1895

calcarata (C. L. Koch, 1835) [26, 41, 42]

quadricornuta (Michael, 1880) [11, 12, 31]

superbula Berlese, 1904 * [66]

Superfamily ORIPODOIDEA Jacot, 1925

Family HAPLOZETIDAE Grandjean, 1936

Genus *Xylobates* Jacot, 1929

capucinus (Berlese, 1908) [55]

Family ORIBATULIDAE Thor, 1929

Genus *Liebstadia* Oudemans, 1906

similis (Michael, 1888) [11, 12, 26, 34, 37, 38, 39, 40, 41, 42, 47, 65, 86, 87]

Genus *Oribatula* Berlese, 1895

saxicola Halbert, 1920 [12, 65]

venusta (Berlese, 1908) [11, 12, 65]

Genus *Phauloppia* Berlese, 1908

lucorum (C. L. Koch, 1841) [10, 11, 81, 82, 83]

rauschenensis (Sellnick, 1908) * [94]

Genus *Zygoribatula* Berlese, 1916

exilis (Nicolet, 1855) [10, 11, 26]

Family SCHELORIBATIDAE Grandjean, 1954

Genus *Dometorina* Grandjean, 1951

plantivaga (Berlese, 1895) [13]

Genus *Hemileius* Berlese, 1916

Bull. Ir. biogeog. Soc. No. 22

initialis (Berlese, 1908) [37, 41, 42, 44, 96, 97, 98]

Genus *Scheloribates* Berlese, 1908

laevigatus (C. L. Koch, 1835) [10, 11, 12, 37, 42]

pallidulus (C. L. Koch, 1841) [25]

Superfamily PHENOPELOPOIDEA Petrunkevitch, 1955

Family PHENOPELOPIDAE Petrunkevitch, 1955

Genus *Eupelops* Ewing, 1917

acromios (Hermann, 1804) [11, 83]

bilobus (Sellnick, 1928) [37, 38, 42]

nepotulus (Berlese, 1917) [26]

plicatus (C. L. Koch, 1835) [11, 31]

tardus (C. L. Koch, 1835) [98]

Genus *Peloptulus* Berlese, 1908

phaeonotus (C. L. Koch, 1844) [11, 26]

APPENDIX 2. County records for the oribatid mites of Ireland.

Not all Irish records have been associated with Counties. Thus:

"Republic of Ireland"

Cosmochthonius lanatus, *Oppia nitens*, *Scapheremaeus palustris*.

NORTHERN IRELAND

(1) Antrim (1)

Scheloribates pallidulus.

(2) Armagh (6)

Camisia segnis, *Chamobates cuspidatus*, *Eremaeus oblongus*, *Humerobates rostromellatus*, *Micreremus brevipes*, *Phauloppia lucorum*.

(3) Down (1)

Scheloribates pallidulus.

(4) Fermanagh (0)

(5) Londonderry (3)

Phthiracarus affinis, *Phthiracarus anonymus*, *Scheloribates pallidulus*.

(6) Tyrone (0)

REPUBLIC OF IRELAND

(1) Carlow (11)

Banksinoma lanceolata, *Carabodes marginatus*, *Ceratoppia bipilis*, *Chamobates schuetzi*, *Edwardzetes edwardsi*, *Melanozetes mollicornus*, *Moritzoppia oreia*, *Mycobates sarekensis*, *Nanhermannia coronata*, *Platynothrus peltifer*, *Pseudachipteria magna*.

(2) Cavan (0)

(3) Clare (4)

Atropacarus striculus, *Hermannia pulchella*, *Serratoppia duffyi*, *Xylobates capucinus*.

(4) Cork (1)

Oribatella quadricornuta.

(5) Donegal (0)

(6) Dublin (76)

Achipteria coleoptrata, *Ameronothrus lineatus*, *Ameronothrus maculatus*, *Aphelacarus* sp., *Banksinoma lanceolata*, *Brachychthonius berlesei*, *Camisia horrida*, *Camisia invenusta*, *Camisia segnis*, *Camisia spinifer*, *Carabodes affinis*, *Carabodes labyrinthicus* (?), *Ceratoppia bipilis*, *Chamobates cuspidatus* (?), *Chamobates schuetzi*, *Chamobates subglobulus*, *Ctenobelba obsoleta*, *Damaeus* sp., *Damaeus* (*Adamaeus*) *onustus*, *Damaeus* (*Paradamaeus*) *clavipes*, *Diapterobates humeralis*, *Dissorhina ornata*, *Dometorina plantivaga*, *Eupelops acromios*, *Eupelops bilobus*, *Euzetes nitens*, *Hemileius initialis*, *Hermannia gibba*, *Hermannia reticulata*, *Hermannia scabra*, *Hermanniella picea*, *Humerobates rostralamellatus*, *Hygroribates bilineatus*, *Hygroribates marinus*, *Hypochthonius rufulus*, *Latilamellobates incisellus*, *Liebstadia similis*, *Limnozetes rugosus*, *Liochthonius brevis* (?), *Liochthonius horridus*, *Liochthonius sellnicki*, *Liochthonius* sp., *Medioppia obsoleta*, *Micreremus brevipes*, *Micropopia minus*, *Minunthozetes semirufus*, *Mycobates parmeliae*, *Nanhermannia nana*, *Neolichthonius piluliferus*, *Neoliodes theleproctus*, *Oppia* sp., *Oppiella nova*, *Oribatella calcarata*, *Oribatula saxicola*, *Oribatula venusta*, *Pantelozetes paolii*, *Parachipteria* ?*punctata*, *Passalozetes perforatus*, *Perlohmanna insignis*, *Phauloppia lucorum*, *Phauloppia rauschenensis*, *Phthiracarus* ?*clavatus*, *Phthiracarus* sp., *Platynothrus peltifer*, *Poroliodes farinosus*, *Punctoribates punctum*, *Punctoribates quadrivertex*, *Ramusella clavipectinata*, *Scheloribates laevigatus*, *Sellnickochthonius zelawaiensis*, *Steganacarus magnus*, *Suctobelbella nasalis* (?), *Suctobelbella sarekensis*, *Trichoribates trimaculatus*, *Xenillus tegeocranus*, *Zygoribatula exilis*.

(7) Galway (0)

(8) Kerry (2)

Conoppia palmicinctum, *Pergalumna nervosa*.

(9) Kildare (40)

Achipteria coleoptrata, *Atropacarus striculus*, *Banksinoma lanceolata*, *Berniniella bicarinata*, *Brachychthonius berlesei*, *Brachychthonius* sp., *Ceratoppia bipilis*, *Chamobates pusillus*, *Damaeus* (*Paradamaeus*) *clavipes*, *Dissorhina ornata*, *Eupelops bilobus*, *Eupelops tardus*, *Euzetes nitens*, *Hemileius initialis*, *Hypochthonius* sp., *Latilamellobates incisellus*, *Liacarus xylariae*, *Liebstadia similis*, *Liochthonius sellnicki*, *Medioppia obsoleta*, *Metabelba papillipes*, *Micropopia minus*, *Minunthozetes semirufus*, *Nanhermannia elegantula*, *Nanhermannia nana*,

Nothrus palustris, *Oppiella nova*, *Oribatella calcarata*, *Pantelozetes paolii*, *Parachipteria nicoleti*, *Phauloppia lucorum*, *Phthiracarus* sp., *Platynothrus peltifer*, *Punctoribates punctum*, *Ramusella clavipectinata*, *Scheloribates laevigatus*, *Sellnickochthonius cricoides* (?), *Suctobelbella acutidens*, *Suctobelbella sarekensis*, *Tectocephus velatus*.

(10) Kilkenny (22)

Adoristes poppei, *Banksinoma lanceolata*, *Ceratoppia bipilis*, *Damaeus* (*Paradamaeus*) *clavipes*, *Dissorhina ornata*, *Epidamaeus* sp., *Liochthonius brevis*, *Liochthonius hystricinus*, *Liochthonius muscorum*, *Liochthonius simplex*, *Medioppia obsoleta*, *Microppia minus*, *Oppiella nova*, *Oribatella superbula*, *Phthiracarus membranifer*, *Quadroppia* sp., *Sellnickochthonius furcatus*, *Sellnickochthonius jacoti*, *Sellnickochthonius immaculatus*, *Sellnickochthonius zelawaiensis*, *Steganacarus magnus*, *Suctobelbella* sp.

(11) Laois (0)

(12) Leitrim (1)

Melanozetes stagnatilis.

(13) Limerick (0)

(14) Longford (0)

(15) Louth (0)

(16) Mayo (70)

Acrogalumna longipluma, *Adoristes ovatus*, *Ameronothrus lineatus*, *Banksinoma lanceolata*, *Camisia biurus*, *Camisia segnis*, *Camisia spinifer*, *Carabodes willmanni*, *Cepheus latus*, *Ceratoppia bipilis*, *Ceratozetes gracilis*, *Chamobates cuspidatus*, *Chamobates schuetzi*, *Chamobates subglobulus*, *Damaeus* (*Paradamaeus*) *clavipes*, *Dissorhina ornata*, *Dometorina plantivaga*, *Edwardzetes edwardsi*, *Eremaeus oblongus*, *Eupelops acromios*, *Eupelops plicatus*, *Euzetes nitens*, *Fuscozetes fuscipes*, *Hermannia convexa*, *Hermannia reticulata*, *Hermannia scabra*, *Hydrozetes lacustris*, *Hygroribates bilineatus*, *Hygroribates marinus*, *Hypochthonius rufulus*, *Liacarus coracinus*, *Liebstadia similis*, *Limnozetes ciliatus*, *Limnozetes rugosus*, *Liochthonius brevis*, *Malaconothrus monodactylus*, *Melanozetes mollicornus*, *Melanozetes stagnatilis*, *?Metabelba papillipes*, *Minunthozetes semirufus*, *Nanhermannia nana*, *Nothrus palustris*, *Nothrus silvestris*, *Odontocephus elongatus*, *Oribatella quadricornuta*, *Oribatula venusta*, *Parachipteria nicoleti*, *Parachipteria* ?*punctata*, *Peloptulus phaeonotus*, *Pergalumna*

nervosa, *Phauloppia lucorum*, *Phthiracarus ?clavatus*, *Phthiracarus* sp., *Platynothrus peltifer*, *Punctoribates punctum*, *Punctoribates quadrivertex*, *Ramusella clavipectinata*, *Rhysotritia ?duplicata*, *Scheloribates laevigatus*, *Scutovertex sculptus*, *Sphaerozetes orbicularis*, *Sphaerozetes piriformis*, *Steganacarus magnus*, *Suctobelba trigona*, *Trichoribates trimaculatus*, *Trimalaconothrus glaber*, *Trimalaconothrus tardus*, *Tritegeus bisulcatus*, *Xenillus tegeocranus*, *Zygoribatula exilis*.

(17) Meath (5)

Hemileius initialis, *Liochthonius brevis*, *Punctoribates punctum*, *Ramusella clavipectinata*, *Suctobelbella subcornigera*.

(18) Monaghan (0)

(19) Offaly (12)

Atropacarus striculus, *Ceratozetes gracilis*, *Dissorhina ornata*, *Hoplophorella* sp., *Hypochothonius luteus*, *Liebstadia similis*, *Punctoribates punctum*, *Quadroppia quadricarinata*, *Ramusella clavipectinata*, *Sellnickochthonius hungaricus*, *Steganacarus magnus*, *Tectocepheus velatus*.

(20) Roscommon (0)

(21) Sligo (0)

(22) Tipperary (0)

(23) Waterford (0)

(24) Westmeath (0)

(25) Wexford (61)

Achipteria coleoptrata, *Adoristes poppei*, *Banksinoma lanceolata*, *Berniniella serratirostris*, *Brachychthonius berlesei*, *Brachychthonius bimaculatus*, *Brachychthonius* sp., *Ceratoppia bipilis*, *Ceratozetes mediocris*, *Chamobates pusillus*, *Damaeus (Paradamaeus) clavipes*, *Dissorhina ornata*, *Eupelops nepotulus*, *Eupelops* sp., *Hermannia scabra*, *Latilamellobates incisellus*, *Liebstadia similis*, *Liochthonius brevis*, *Liochthonius horridus*, *Liochthonius lapponicus*, *Liochthonius leptaleus*, *Liochthonius muscorum*, *Liochthonius sellnicki*, *Liochthonius* sp., *Malaconothrus monodactylus*, *Malaconothrus processus*, *Malaconothrus purvisi*, *Medioppia obsoleta*, *Microppia minutissima*, *Minunthozetes semirufus*, *Multioppia excisa*, *Nanhermannia nana*, *Neoliochthonius piluliferus*, *Neoliochthonius* sp., *Oppiella nova*,

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Oribatella calcarata, *Pantelozetes multidentata*, *Parachipteria nicoleti*, *Passalozetes* sp.,
Peloptulus phaeonotus, *Phthiracarus anonymus*, *Platynothrus peltifer*, *Punctoribates punctum*,
Quadroppia quadricarinata, *Ramusella clavipectinata*, *Ramusella* sp., *Scutovertex minutus*,
Sellnickochthonius cricoides, *Sellnickochthonius hungaricus*, *Sellnickochthonius immaculatus*,
Sellnickochthonius jacoti, *Sellnickochthonius* sp., *Sellnickochthonius suecicus*, *Steganacarus*
magnus, *Suctobelbella acutidens*, *Suctobelbella falcata*, *Suctobelbella subcornigera*,
Tectocephus velatus, *Trichoribates novus*, *Xenillus tegeocranus*, *Zygoribatula exilis*.

(26) Wicklow (7)

Caleremaeus monilipes, *Camisia spinifer*, *Damaeus* (*Adamaeus*) *onustus*, *Hermanniella picea*,
Liacarus coracinus, *Pseudachipteria magna*, ?*Subiasella lamellata*.

APPENDIX 3. Check list of the parasitiform mites of Ireland.

Asterisks indicate that, within the British Isles, the taxon is thus far recorded only for Ireland.
The numbers in square brackets relate to citations in the reference list.

Suborder ANTENNOPHORINA

Family ANTENNOPHORIDAE Berlese, 1892

Genus *Antennophorus* Haller, 1887

uhlmanni Haller, 1887 [13]

Family CELAENOPSIDAE Berlese, 1892

Genus *Celaenopsis* Berlese, 1886

badius (C. L. Koch, 1839) [11]

Suborder GAMASINA

Family AMEROSEIIDAE Evans, 1963

Genus *Ameroseius* Berlese, 1903

corbiculus (Sowerby, 1806) [11, 15, 26, 42, 43, 44, 83]

Genus *Epicriopsis* Berlese, 1916

horridus (Kramer, 1876) [26, 37, 42, 43, 45]

Genus *Kleemannia* Oudemans, 1930

gracilis (Halbert, 1923) * [13]

plumigera (Oudemans, 1930) [25, 50, 55, 68, 69]

plumosus (Oudemans, 1902) [25, 50, 55, 68, 69]

Family ASCIDAE Voigts et Oudemans, 1905

Genus *Antennoseius* Berlese, 1916

unidentified species [26]

Genus *Arctoseius* Thor, 1930

butleri (Hughes, 1948) [25, 50, 56, 68, 69]

cetratus (Sellnick, 1940) [34, 37, 44, 47, 96, 97, 98]

magnanalis Evans, 1958 [37]

pannonicus Willmann, 1949 [42, 44]

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Genus *Asca* von Heyden, 1826

bicornis (Canestrini et Fanzago, 1887) [13]

Genus *Blattisocius* Keegan, 1944

dentriticus (Berlese, 1918) [13, 37, 50, 69]

keegani Fox, 1947 [50]

mali (Oudemans, 1929) [94]

tarsalis (Berlese, 1918) [25, 50]

Genus *Cheiroseius* Berlese, 1916

borealis (Berlese, 1904) [42, 44, 47]

curtipes (Halbert, 1923) [6, 13]

laelaptoides (Berlese, 1887) [6, 13]

serratus (Halbert, 1915) * [11, 15]

Genus *Gamasellodes* Athias-Henriot, 1961

bicolor (Berlese, 1908) [26, 42, 50]

Genus *Iphidozercon* Berlese, 1903

corticalis Evans, 1958 [44]

minutus (Halbert, 1915) [11, 13, 26, 37, 38, 40, 42, 56]

Genus *Lasioseius* Berlese, 1916

berlesei (Oudemans, 1938) [98]

muricatus (C. L. Koch, 1839) [11]

ometes (Oudemans, 1903) [13]

penicilliger Berlese, 1916 [50]

Genus *Leioseius* Berlese, 1916

salinus (Halbert, 1920) [12]

Genus *Melichares* Hering, 1838

unidentified species [42]

Genus *Neojordensia* Evans, 1957

levis (Oudemans et Voigts, 1904) [11, 15, 26, 42, 43, 44, 56]

Genus *Platyseius* Berlese, 1916

italicus (Berlese, 1905) [6, 11, 13, 15, 94]

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major (Halbert, 1923) [6, 13]

subglaber (Oudemans, 1903) [13]

Genus *Proctolaelaps* Berlese, 1923

pygmaeus (Müller, 1860) [50, 52]

Genus *Protogamasellus* Karg, 1962

hibernicus Evans, 1982 * [60]

mica (Athias-Henriot, 1961) * [26, 60]

singularis (Karg, 1962) [26, 60]

Genus *Zerconopsis* Hull, 1918

remiger (Kramer, 1876) [11, 50]

Genus *Zercozeius* Berlese, 1916

spathuliger (Leonardi, 1899) [11, 15]

Family DERMANYSSIDAE Kolenati, 1859

Genus *Dermanyssus* de Geer, 1778

Subgenus *Dermanyssus* de Geer, 1778

gallinae (de Geer, 1778) [61]

Family DIGAMASELLIDAE Evans, 1957

Genus *Dendrolaelaps* Halbert, 1915

cornutus (Kramer, 1886) * [13]

foveolatus (Leitner, 1949) [26, 34]

oudemansi Halbert, 1915 * [11, 15]

Genus *Dendroseius* Karg, 1965

scotarius (Sheals, 1958) [26, 37, 39, 40]

Genus *Digamasellus* Berlese, 1905

inermis (Halbert, 1920) * [12]

Genus *Punctodendrolaelaps* Hirschmann et Wisniewski, 1982

strenzei (Hirschmann, 1960) * [53]

Family EPICRIIDAE Berlese, 1885

Genus *Epicrius* Canestrini et Fanzago, 1887

mollis (Kramer, 1876) [11, 15]

Family EVIPHIDIDAE Berlese, 1913

Genus *Alliphis* Halbert, 1923

halleri (G. et R. Canestrini, 1881) [13, 26, 34, 38, 42, 43, 44, 45, 46, 47, 48, 49, 50, 96, 97, 98]

Genus *Crassicheles* Karg, 1963

holsaticus (Willmann, 1937) [59]

Genus *Eviphis* Berlese, 1903

ostrinus (C. L. Koch, 1836) [11, 26, 37]

Genus *Thinoseius* Halbert, 1920

fucicola (Halbert, 1920) [12, 54, 58]

Family HALARACHNIDAE Oudemans, 1906

Genus *Halarachne* Allman, 1847

halichoeri Allman, 1847 [89]

Family HALOLAEAPIDAE Karg, 1965

Genus *Halolaelaps* Berlese et Trouessart, 1889

celticus Halbert, 1915 [11, 12, 71]

marinus (Brady, 1875) [11, 12, 71]

Genus *Leitneria* Evans, 1957 *

granulata (Halbert, 1923) * [13]

Family LAELAPIDAE Berlese, 1892

Genus *Androlaelaps* Berlese, 1903

casalis (Berlese, 1887) [50]

Genus *Cosmolaelaps* Berlese, 1903

claviger (Berlese, 1883) [11, 15, 26, 47]

vacua (Michael, 1891) [7, 11, 15, 37, 51]

Genus *Eulaelaps* Berlese, 1903

stabularis (C. L. Koch, 1836) [11, 13, 25, 50]

Genus *Haemogamasus* Berlese, 1889

arvicularum (Berlese, 1920) [92]

pontiger (Berlese, 1904) [11, 25, 50]

Bull. Ir. biogeog. Soc. No. 22

Genus *Holostaspis* Kolenati, 1858

montana (Berlese, 1904) [7, 11, 51]

Genus *Hypoaspis* Canestrini, 1884

Subgenus *Alloparasitus* Berlese, 1920

acuta (Michael, 1891) * [7, 11, 15, 51]

oblongus (Halbert, 1915) [7, 11, 15]

sardous (Berlese, 1911) [25]

Subgenus *Gaeolaelaps* Trägårdh, 1952

aculeifer (Canestrini, 1884) [13, 26, 37, 44, 50]

lubrica (Voigts et Oudemans, 1904) [25, 50]

nolli Karg, 1962 * [26]

Genus *Laelaps* C. L. Koch, 1836

agilis C. L. Koch, 1836 [11, 13, 15]

Genus *Laelaspis* Berlese, 1903

astronomica (C. L. Koch, 1839) [26]

Genus *Myonyssus* Tiraboschi, 1904

decumani Tiraboschi, 1904 [13]

Genus *Ololaelaps* Berlese, 1904

placentula (Berlese, 1887) [11, 15]

veneta (Berlese, 1903) [11, 15]

Genus *Pseudoparasitus* Oudemans, 1902

meridionalis (G. et R. Canestrini, 1882) [11, 15]

ovatulus (Halbert, 1915) [7, 11, 12, 15, 26]

Family MACROCHELIDAE Vitzthum, 1930

Genus *Geholaspis* Berlese, 1918

Subgenus *Geholaspis* Berlese, 1918

aeneus Krauss, 1970 * [66, 77]

longispinosus (Kramer, 1876) [11, 26, 77]

Subgenus *Longicheles* Valle, 1953

mandibularis (Berlese, 1904) [11, 26, 77]

Genus *Glyphtholaspis* Filipponi et Pegazzano, 1960

americana (Berlese, 1888) [13, 76, 77]

Genus *Holostaspella* Berlese, 1903

ornata (Berlese, 1904) [77]

subornata Bregetova et Koroleva, 1960 * [77]

Genus *Macrocheles* Latreille, 1829

carinatus (C. L. Koch, 1839) [37, 44, 77]

decoloratus (C. L. Koch, 1839) [77]

dentatus (Evans et Browning, 1956) [26, 77]

glaber (Müller, 1860) [11, 12, 37, 42, 44, 77]

matrius (Hull, 1925) [25, 50]

montanus (Willmann, 1951) [77]

opacus (C. L. Koch, 1839) [26, 37, 77]

penicilliger (Berlese, 1904) [42, 44, 77]

subbadius (Berlese, 1904) [77]

submotus Falconer, 1923 [11, 26, 44, 77]

tardus (C. L. Koch, 1841) [77]

terreus (Canestrini et Fanzago, 1877) [11, 77]

Family MACRONYSSIDAE Oudemans, 1936

Genus *Steatonyssus* Kolenati, 1858

periblepharus Kolenati, 1858 [91]

Family PACHYLAELAPIDAE Berlese, 1913

Genus *Pachylaelaps* Berlese, 1886

littoralis Halbert, 1915 * [11, 12, 15, 63]

longisetis Halbert, 1915 [11, 15, 26]

magnus (Halbert, 1915) * [11, 63]

Genus *Pachyseius* Berlese, 1910

angustiventris Willmann, 1935 [37]

humeralis Berlese, 1910 [37]

Family PARASITIDAE Oudemans, 1901

Bull. Ir. biogeog. Soc. No. 22

Genus *Amblygamasus* Berlese, 1904

mirabilis (Willmann, 1951) [26, 37, 86]

Genus *Cornigamasus* Evans et Till, 1979

lunaris (Berlese, 1882) [11, 44, 72, 75]

Genus *Eugamasus* Berlese, 1892

berlesei Willmann, 1935 [72, 75]

cavernicola Trägårdh, 1912 [93]

crassitarsis (Halbert, 1923) [13, 37, 72]

Genus *Gamasodes* Oudemans, 1939

bispinosus (Halbert, 1915) [11, 15, 26, 72]

fimbriatus Karg, 1971 [11, 12, 72]

spiniger (Trägårdh, 1910) [11, 12, 44, 72, 75]

Genus *Holoparasitus* Oudemans, 1936

calcaratus (C. L. Koch, 1839) [11, 26]

inornatus (Berlese, 1906) [11, 73]

lawrencei Hyatt, 1987 [73]

stramenti Karg, 1971 [11, 26, 73]

Genus *Leptogamasus* Trägårdh, 1936

parvulus (Berlese, 1903) [11, 15]

suecicus Trägårdh, 1936 [37, 86]

Genus *Lysigamasus* Karg, 1971

armatus (Halbert, 1915) [11, 15, 26, 42, 44]

celticus (Bhattacharyya, 1963) * [26, 32, 37, 66]

digitulus (Karg, 1963) [26, 37, 96, 97, 98]

femoratus (Bhattacharyya, 1963) * [32, 37, 38]

lapponicus (Trägårdh, 1910) [11, 15, 26, 37, 38]

misellus (Berlese, 1903) [26, 37]

parrunciger (Bhattacharyya, 1963) [37, 38]

processiferus (Halbert, 1915) * [11, 15]

runcatellus (Berlese, 1903) [11, 26, 42, 44, 47, 86, 87, 96, 97, 98]

runciger (Berlese, 1904) [11, 26, 34, 42, 43, 44]

truncus (Schweizer, 1961) [50]

Genus *Paragamasus* Hull, 1918

alpestris (Berlese, 1904) [11, 26]

diversus (Halbert, 1915) [11, 15, 32]

robustus (Oudemans, 1902) [11, 15, 26]

Genus *Parasitellus* Willmann, 1939

ignotus (Vitzthum, 1930) [72]

talparum (Oudemans, 1913) [72, 94]

Genus *Parasitus* Latreille, 1795

americanus (Berlese, 1906) * [74, 75]

beta Oudemans et Voigts, 1904 [72, 86]

coleopratorum (Linnaeus, 1758) [11, 44, 72]

consanguineus Oudemans et Voigts, 1904 [72, 75]

evertsi Oudemans, 1902 [72]

fimetorum (Berlese, 1904) [26, 37, 44, 72, 75, 94]

hyalinus (Willmann, 1949) [34, 47, 72]

kempersi Oudemans, 1902 [11, 72]

loricatus (Wankel, 1861) [25, 72]

neglectus (Berlese, 1903) [37]

Genus *Pergamasus* Berlese, 1904

alpinus (Berlese, 1903) [15]

crassipes (Linnaeus, 1758) [11, 32, 42]

longicornis (Berlese, 1906) [11, 12, 26, 32, 37, 42, 44, 86, 87]

norvegicus (Berlese, 1905) [11, 15, 32]

septentrionalis (Oudemans, 1902) [37, 44]

Genus *Poecilochirus* G. et R. Canestrini, 1882

carabi G. et R. Canestrini, 1882 [11, 72, 75, 76, 94]

davydovae Hyatt, 1980 [75]

subterraneus (Müller, 1860) [72, 75]

Bull. Ir. biogeog. Soc. No. 22

Genus *Porrhostaspis* Müller, 1859

lunulata Müller, 1859 [15, 37, 72, 75]

Genus *Trachygamasus* Berlese, 1904

ambulacralis (Willmann, 1949) [72]

gracilis (Karg, 1965) * [44, 72]

Genus *Vulgarogamasus* Tichomirov, 1969

burchanensis (Oudemans, 1903) [25, 50, 69, 72]

immanis (Berlese, 1904) [11, 12, 15, 72, 75]

kraepelini (Berlese, 1905) [11, 37, 38, 72]

oudemansi (Berlese, 1904) [72]

trouessarti (Berlese, 1892) [11]

Family PHYTOSEIIDAE Berlese, 1916

Genus *Amblydromella* Muma, 1961

foenilis (Oudemans, 1930) * [64, 83]

rhenana (Oudemans, 1905) [64, 82]

rhenanoides (Athias-Henriot, 1960) * [83]

richteri (Karg, 1970) * [83]

Genus *Amblyseius* Berlese, 1904

deleoni Muma et Denmark, 1970 [83]

subspecies *hibernicus* Momen, 1987 * [83]

Genus *Anthoseius* de Leon, 1959

intermedius Momen, 1987 * [83]

Genus *Euseius* Wainstein, 1962

finlandicus (Oudemans, 1915) [42, 83]

Genus *Neoseiulus* Hughes, 1948

barkeri Hughes, 1948 [50, 68]

cucumeris (Oudemans, 1930) [42, 43, 52, 53, 83]

Genus *Phytoseius* Ribaga, 1902

spoofi (Oudemans, 1915) [82, 83]

Genus *Seiulus* Berlese, 1887

Bull. Ir. biogeog. Soc. No. 22

bidentatus Momen, 1987 * [83]

Genus *Typhloctonus* Muma, 1961

tiliarum (Oudemans, 1930) [83]

Genus *Typhlodromips* de Leon, 1965

bryophilus (Karg, 1970) * [42, 43]

Genus *Typhlodromus* Scheuten, 1857

pyri Scheuten, 1857 [42, 43, 82, 83]

tiliae Oudemans, 1929 [44]

Family RHODACARIDAE Oudemans, 1902

Genus *Cyrtolaelaps* Berlese, 1887

mucronatus (G. et R. Canestrini, 1881) [11, 13]

Genus *Hydrogamasus* Berlese, 1892

giardi (Berlese et Trouessart, 1889) [11, 12, 15]

littoralis (G. et R. Canestrini, 1881) [12]

Genus *Minirhodacarellus* Shcherbak, 1980 *

minimus (Karg, 1961) * [26]

Genus *Rhodacarellus* Willmann, 1935

epigynialis Sheals, 1956 [37]

silesiacus Willmann, 1936 [26, 37, 39, 40, 44, 48, 96, 97, 98]

Genus *Rhodacarus* Oudemans, 1902

clavulatus Athias-Henriot, 1961 * [26]

pallidus Hull, 1917 [12, 48, 86]

roseus Oudemans, 1902 [12, 15, 37, 40, 96, 97, 98]

strenzkei Willmann, 1957 * [26]

Family SPINTURNICIDAE Oudemans, 1901

Genus *Paraperiglischrus* Rudnick, 1960

rhinolophinus (C. L. Koch, 1841) [92]

Genus *Spinturnix* von Heyden, 1826

plecotinus (C. L. Koch, 1836) [92]

Family VEIGAIIDAE Oudemans, 1939

Bull. Ir. biogeog. Soc. No. 22

Genus *Cyrthyrolaelaps* Berlese, 1905

hirtus Berlese, 1905 [11, 12]

incisus Evans, 1955 [11, 57]

Genus *Gamasolaelaps* Berlese, 1904

excisus (L. Koch, 1879) [11, 12]

Genus *Veigaia* Oudemans, 1905

agilis (Berlese, 1916) [26, 37, 42, 66, 90, 96, 97, 98]

cerva (Kramer, 1876) [11, 26, 37]

exigua (Berlese, 1916) [90]

kochi (Trägårdh, 1901) [11, 37]

nemorensis (C. L. Koch, 1839) [11, 26, 37, 38, 42, 47, 66]

planicola (Berlese, 1892) [26, 37, 47]

transisalae (Oudemans, 1901) [11, 93]

Family ZERCONIDAE Canestrini, 1891

Genus *Prozercon* Sellnick, 1943

fimbriatus (C. L. Koch, 1839) [11, 15]

traegardhi (Halbert, 1923) [13]

Genus *Seiodes* Berlese, 1887 *

(familial placement uncertain: see Evans (1955))

unidentified species [25]

Genus *Zercon* C. L. Koch, 1836

perforatulus Berlese, 1903 [13]

triangularis C. L. Koch, 1836 [11, 15, 26]

zelawaiensis Sellnick, 1944 [55]

Suborder SEJINA

Family SEJIDAE Berlese, 1913

Genus *Sejus* C. L. Koch, 1836

togatus C. L. Koch, 1836 [13]

Bull. Ir. biogeog. Soc. No. 22

Suborder UROPODINA

Family POLYASPIDIDAE Berlese, 1917

Genus *Polyaspinus* Berlese, 1916

cylindricus Berlese, 1916 [13]

Genus *Polyaspis* Berlese, 1881

unidentified species [37]

Genus *Trachytes* Michael, 1894

minima Trägårdh, 1910 [55, 66]

pauperior (Berlese, 1914) * [13]

pyriformis (Kramer, 1876) [13]

Genus *Uroseius* Berlese, 1888

Subgenus *Apionoseius* Berlese, 1904

turki Hirschmann, 1979 [94]

Subgenus *Uroseius* Berlese, 1888

acuminatus (C. L. Koch, 1847) [13]

Family PROTODINCHIDAE Evans, 1957

Genus *Protodinchus* Evans, 1957

unidentified species [37]

Family THINOZERCONIDAE Halbert, 1915

Genus *Thinozercon* Halbert, 1915

michaeli Halbert, 1915 [11, 12, 15]

Family TRACHYUROPODIDAE Berlese, 1917

Genus *Oplitis* Berlese, 1884

philoctena (Trouessart, 1902) [11, 15, 51]

Genus *Trachyuropoda* Berlese, 1888

celtica Halbert, 1907 [10, 13]

coccinea (Michael, 1891) [10, 11, 15, 51]

formicaria (Lubbock, 1881) [10, 11, 15, 51]

sinuata (Berlese, 1904) [11, 51]

troguloides (Canestrini et Fanzago, 1877) [11, 15, 51]

Bull. Ir. biogeog. Soc. No. 22

Family TREMATURIDAE Berlese, 1917

Genus *Trichouropoda* Berlese, 1916

campomolendina (Berlese, 1887) [11, 15]

jacksonia (Hughes, 1948) [25, 50, 68, 69]

obscura (C. L. Koch, 1836) [11, 13, 15]

orbicularis (C. L. Koch, 1839) [25, 50]

punctatissima (Halbert, 1915) * [11, 15]

Family UROPODIDAE Berlese, 1900

Genus *Discourella* Berlese, 1910

cordieri (Berlese, 1916) [13]

Genus *Uropoda* Latreille, 1806

Subgenus *Cilliba* von Heyden, 1826

cassidea (Hermann, 1804) [11, 66]

Subgenus *Phaulodinychus* Berlese, 1903

littoralis (Trouessart, 1902) * [11, 12, 15]

orchestiidarum (Barrois, 1887) [12]

pulcherrima (Berlese, 1903) [11, 15, 51]

repletus (Berlese, 1903) [11, 12]

Subgenus *Uropoda* Latreille, 1806

halberti Hirschmann, 1993 [11, 12, 15]

minima Kramer, 1882 [11, 26, 37, 38, 42, 44, 47, 66, 98]

orbicularis (Müller, 1776) [25, 26, 42, 44]

Family URODINYCHIDAE Berlese, 1917

Genus *Dinychus* Kramer, 1882

carinatus Berlese, 1903 * [13]

inermis (C. L. Koch, 1841) [26]

perforatus Kramer, 1882 [11, 15, 26, 42]

Genus *Uroobovella* Berlese, 1905

euris (F. et S. Turk, 1952) * [94]

marginata (C. L. Koch, 1839) [25, 50]

notabilis Berlese, 1903 [11, 15, 51]

APPENDIX 4. County records for the parasitiform mites of Ireland.

Not all Irish records have been associated with Counties. Thus:

"Ireland"

Pergamasus alpinus.

"Northern Ireland"

Eulaelaps stabularis, *Uroobovella marginata*.

"Republic of Ireland"

Androlaelaps casalis, *Arctoseius butleri*, *Blattisocius keegani*, *Blattisocius tarsalis*, *Hypoaspis* (*Gaeolaelaps*) *lubrica*, *Kleemannia plumigera*, *Lasioseius penicilliger*, *Lysigamasus truncus*, *Macrocheles matrius*, *Neoseiulus barkeri*, *Proctolaelaps pygmaeus*, *Trichouropoda jacksonia*, *Trichouropoda orbicularis*, *Uroobovella marginata*, *Vulgarogamasus burchanensis*.

NORTHERN IRELAND

(1) Antrim (18)

Arctoseius butleri, *Blattisocius tarsalis*, *Cosmolaelaps* sp., *Eugamasus* sp., *Haemogamasus pontiger*, *Hypoaspis* (*Alloparasitus*) *sardous*, *Hypoaspis* (*Gaeolaelaps*) *lubrica*, *Hypoaspis* sp., *Kleemannia plumigera*, *Kleemannia plumosus*, *Laelaps* sp., *Macrocheles matrius*, *Parasitus loricatus*, *Parasitus* sp., *Seiulus* sp., *Trichouropoda orbicularis*, *Uropoda* (*Uropoda*) *orbicularis*, *Vulgarogamasus burchanensis*.

(2) Armagh (7)

Amblydromella rhenana, *Gamasodes bispinosus*, *Phytoseius spoofi*, *Trichouropoda jacksonia*, *Trichouropoda orbicularis*, *Typhlodromus pyri*, *Zercon* sp.

(3) Down (10)

Eugamasus sp., *Haemogamasus pontiger*, *Hypoaspis* (*Gaeolaelaps*) *lubrica*, *Kleemannia plumigera*, *Kleemannia plumosus*, *Macrocheles matrius*, *Parasitus loricatus*, *Parasitus* sp., *Seiodes* sp., *Vulgarogamasus burchanensis*.

(4) Fermanagh (1)

Steatonyssus periblepharus.

(5) Londonderry (12)

Arctoseius butleri, *Haemogamasus pontiger*, *Hypoaspis* (*Alloparasitus*) *sardous*, *Hypoaspis*

Bull. Ir. biogeog. Soc. No. 22

(*Gaeolaelaps*) *lubrica*, *Hypoaspis* sp., *Laelaps* sp., *Macrocheles matrius*, *Seiodes* sp., *Seiulus* sp., *Trichouropoda jacksonia*, *Trichouropoda orbicularis*, *Uropoda* (*Uropoda*) *orbicularis*.

(6) Tyrone (5)

Hypoaspis (*Gaeolaelaps*) *lubrica*, *Hypoaspis* sp., *Kleemannia plumigera*, *Kleemannia plumosus*, *Trichouropoda orbicularis*.

REPUBLIC OF IRELAND

(1) Carlow (0)

(2) Cavan (0)

(3) Clare (35)

Cornigamasus lunaris, *Eugamasus berlesei*, *Gamasodes fimbriatus*, *Gamasodes spiniger*, *Geholaspis* (*Geholaspis*) *longispinosus*, *Geholaspis* (*Longicheles*) *mandibularis*, *Glyptolaspis americana*, *Holoparasitus inornatus*, *Holoparasitus lawrencei*, *Holoparasitus stramenti*, *Holostaspella ornata*, *Holostaspella subornata*, *Lysigamasus femoratus*, *Lysigamasus lapponicus*, *Macrocheles carinatus*, *Macrocheles dentatus*, *Macrocheles glaber*, *Macrocheles opacus*, *Macrocheles penicilliger*, *Macrocheles subbadius*, *Macrocheles submotus*, *Parasitus coleoptratorum*, *Parasitus consanguineus*, *Parasitus fimetorum*, *Parasitus kempersi*, *Pergamasus crassipes*, *Pergamasus longicornis*, *Pergamasus norvegicus*, *Platyseius italicus*, *Platyseius subglaber*, *Porrhostaspis lunulata*, *Trachygamasus ambulacralis*, *Trachytes minima*, *Veigaia transisalae*, *Zercon zelawaiensis*.

(4) Cork (13)

Eugamasus cavernicola, *Macrocheles decoloratus*, *Macrocheles glaber*, *Neojordensia levis*, *Parasitellus ignotus*, *Parasitus coleoptratorum*, *Parasitus consanguineus*, *Parasitus fimetorum*, *Parasitus kempersi*, *Parasitus loricatus*, *Thinozercon michaeli*, *Vulgarogamasus immanis*, *Vulgarogamasus oudemansi*.

(5) Donegal (0)

(6) Dublin (99)

Alliphis halleri, *Amblydromella richteri*, *Amblydromella foenilis*, *Amblydromella rhenanoides*, *Amblyseius deleoni hibernicus*, *Ameroseius corbiculus*, *Anthoseius intermedius*, *Arctoseius pannonicus*, *Asca bicornis*, *Blattisocius dentriticus*, *Blattisocius mali*, *Celaenopsis badius*,

Cheiroseius borealis, *Cheiroseius curtipes*, *Cheiroseius laelaptoides*, *Cornigamasus lunaris*, *Cosmolaelaps claviger*, *Cyrtodrolaelaps hirtus*, *Cyrtodrolaelaps incisus*, *Cyrtolaelaps mucronatus*, *Dendrolaelaps cornutus*, *Dendrolaelaps foveolatus*, *Dendrolaelaps oudemansi*, *Digamasellus inermis*, *Dinychus carinatus*, *Dinychus perforatus*, *Discourella cordieri*, *Epicriopsis horridus*, *Eugamasus crassitarsis*, *Euseius finlandicus*, *Gamasellodes bicolor*, *Gamasolaelaps excisus*, *Geholaspis (Longicheles) mandibularis*, *Glyptholaspis americana*, *Haemogamasus arvicolarum*, *Halarachne halichoeri*, *Halolaelaps celticus*, *Halolaelaps marinus*, *Holoparasitus* sp., *Hydrogamasus giardi*, *Hydrogamasus littoralis*, *Hypoaspis (Gaeolaelaps) aculeifer*, *Iphidozercon minutus*, *Kleemannia gracilis*, *Lasioseius* sp., *Leioseius salinus*, *Leitneria granulata*, *Leptogamasus parvulus*, *Lysigamasus armatus*, *Lysigamasus runcatellus*, *Lysigamasus runciger*, *Macrocheles glaber*, *Macrocheles penicilliger*, *Macrocheles terreus*, *Neojordensia levis*, *Neoseiulus cucumeris*, *Paragamasus alpestris*, *Parasitellus talparum*, *Parasitus coleoptratorum*, *Parasitus kempersi*, *Parasitus* sp., *Pergamasus crassipes*, *Pergamasus* sp., *Phytoseius spoofi*, *Platyseius italicus*, *Platyseius major*, *Platyseius subglaber*, *Porrhostaspis lunulata*, *Prozercon traegardhi*, *Pseudoparasitus meridionalis*, *Pseudoparasitus ovatulus*, *Rhodacarus pallidus*, *Rhodacarus roseus*, *Seiulus bidentatus*, *Spinturnix plecotinus*, *Thinoseius fucicola*, *Thinozercon michaeli*, *Trachyuropoda celtica*, *Trachyuropoda coccinea*, *Trachyuropoda formicaria*, *Trachyuropoda sinuata*, *Trachyuropoda troguloides*, *Trichouropoda obscura*, *Typhloctonus tiliarum*, *Typhlodromips bryophilus*, *Typhlodromus pyri*, *Uroobovella euris*, *Uropoda (Phaulodinychus) littoralis*, *Uropoda (Phaulodinychus) orchestridarum*, *Uropoda (Phaulodinychus) repletus*, *Uropoda (Uropoda) halberti*, *Uropoda (Uropoda) minima*, *Uropoda (Uropoda) orbicularis*, *Veigaia agilis*, *Veigaia nemorensis*, *Veigaia* sp., *Vulgarogamasus immanis*, *Vulgarogamasus kraepelini*, *Vulgarogamasus trouessarti*.

(7) Galway (10)

Geholaspis (Geholaspis) longispinosus, *Geholaspis (Longicheles) mandibularis*, *Holoparasitus stramenti*, *Macrocheles dentatus*, *Macrocheles glaber*, *Macrocheles opacus*, *Macrocheles submotus*, *Parasitus coleoptratorum*, *Parasitus fimetorum*, *Vulgarogamasus immanis*.

(8) Kerry (4)

Eugamasus berleseii, *Holoparasitus inornatus*, *Lysigamasus celticus*, *Paragamasus diversus*.

(9) Kildare (63)

Alliphis halleri, *Amblygamasus mirabilis*, *Arctoseius cetratus*, *Arctoseius magnanalis*, *Arctoseius* sp., *Blattisocius dentriticus*, *Cornigamasus lunaris*, *Cosmolaelaps vacua*, *Crassicheles holsaticus*, *Dendroseius scotarius*, *Dinychus* sp., *Epicriopsis horridus*, *Eugamasus crassitarsis*, *Eviphis ostrinus*, *Gamasodes bispinosus*, *Gamasodes spiniger*, *Holoparasitus* sp., *Hypoaspis* (*Gaeolaelaps*) *aculeifer*, *Iphidozercon minutus*, *Lasioseius berlesei*, *Lasioseius ometes*, *Leptogamasus suecicus*, *Lysigamasus celticus*, *Lysigamasus digitulus*, *Lysigamasus femoratus*, *Lysigamasus lapponicus*, *Lysigamasus misellus*, *Lysigamasus parrunciger*, *Lysigamasus runcatellus*, *Macrocheles carinatus*, *Macrocheles* sp., *Melichares* sp., *Neoseiulus cucumeris*, *Parasitus americanus*, *Parasitus beta*, *Parasitus coleoptratorum*, *Parasitus fimetorum*, *Parasitus neglectus*, *Parasitus* sp., *Pergamasus longicornis*, *Pergamasus septentrionalis*, *Pergamasus* sp., *Polyaspis* sp., *Porrhostaspis lunulata*, *Proctolaelaps pygmaeus*, *Proctolaelaps* sp., *Protodinychus* sp., *Prozercon* sp., *Punctodendrolaelaps strenzkei*, *Rhodacarellus epigynialis*, *Rhodacarellus silesiacus*, *Rhodacarus pallidus*, *Rhodacarus roseus*, *Trachygamasus gracilis*, *Typhlodromus* sp., *Uropoda* (*Uropoda*) *minima*, *Uropoda* (*Uropoda*) sp., *Veigaia agilis*, *Veigaia cerva*, *Veigaia kochi*, *Veigaia nemorensis*, *Veigaia planicola*, *Vulgarogamasus kraepelini*.

(10) Kilkenny (8)

Antennophorus uhlmanni, *Epicriopsis* sp., *Geholaspis* (*Geholaspis*) *aeneus*, *Lysigamasus celticus*, *Uropoda* (*Cilliba*) *cassidea*, *Uropoda* (*Uropoda*) *minima*, *Veigaia agilis*, *Veigaia nemorensis*.

(11) Laois (0)

(12) Leitrim (8)

Geholaspis (*Geholaspis*) *longispinosus*, *Geholaspis* (*Longicheles*) *mandibularis*, *Holoparasitus inornatus*, *Holoparasitus stramenti*, *Macrocheles carinatus*, *Macrocheles submotus*, *Macrocheles tardus*, *Parasitus evertsi*.

(13) Limerick (1)

Eugamasus berlesei.

(14) Longford (0)

(15) Louth (0)

(16) Mayo (78)

Cheiroseius serratus, *Cornigamasus lunaris*, *Cosmolaelaps vacua*, *Cyrthidrolaelaps hirtus*, *Cyrthidrolaelaps incisus*, *Dendrolaelaps oudemansi*, *Dinychus perforatus*, *Epicrius mollis*, *Eugamasus crassitarsis*, *Eulaelaps stabularis*, *Eviphis ostrinus*, *Gamasodes bispinosus*, *Gamasodes fimbriatus*, *Gamasodes spiniger*, *Gamasolaelaps excisus*, *Geholaspis* (*Geholaspis*) *aeneus*, *Geholaspis* (*Geholaspis*) *longispinosus*, *Geholaspis* (*Longicheles*) *mandibularis*, *Haemogamasus pontiger*, *Halolaelaps celticus*, *Halolaelaps marinus*, *Holoparasitus calcaratus*, *Holoparasitus inornatus*, *Holoparasitus stramenti*, *Holostaspis montana*, *Hypoaspis* (*Alloparasitus*) *acuta*, *Hypoaspis* (*Alloparasitus*) *oblongus*, *Iphidozercon minutus*, *Laelaps agilis*, *Lysigamasus armatus*, *Lysigamasus lapponicus*, *Lysigamasus processiferus*, *Lysigamasus runcatellus*, *Lysigamasus runciger*, *Macrocheles glaber*, *Macrocheles opacus*, *Macrocheles submotus*, *Macrocheles terreus*, *Neojordensia levis*, *Ololaelaps placentula*, *Ololaelaps veneta*, *Oplitis philoctena*, *Pachylaelaps littoralis*, *Pachylaelaps longisetis*, *Pachylaelaps magnus*, *Paragamasus diversus*, *Paragamasus robustus*, *Paraperiglischrus rhinolophinus*, *Parasitus coleoptratorum*, *Parasitus fimetorum*, *Pergamasus crassipes*, *Pergamasus longicornis*, *Pergamasus norvegicus*, *Platyseius italicus*, *Poecilochirus carabi*, *Porrhostaspis lunulata*, *Pseudoparasitus meridionalis*, *Pseudoparasitus ovatulus*, *Thinozercon michaeli*, *Trachyuropoda formicaria*, *Trichouropoda campomolendina*, *Trichouropoda punctatissima*, *Uroobovella notabilis*, *Uropoda* (*Cilliba*) *cassidea*, *Uropoda* (*Phaulodinychus*) *orchestiidarum*, *Uropoda* (*Phaulodinychus*) *repletus*, *Uropoda* (*Uropoda*) *halberti*, *Uropoda* (*Uropoda*) *minima*, *Veigaia cerva*, *Veigaia kochi*, *Veigaia nemorensis*, *Veigaia transisalae*, *Vulgarogamasus immanis*, *Vulgarogamasus kraepelini*, *Zercon perforatulus*, *Zercon triangularis*, *Zerconopsis remiger*, *Zercoseius spathuliger*.

(17) Meath (32)

Alliphis halleri, *Alliphis* sp., *Ameroseius corbiculus*, *Arctoseius cetratus*, *Arctoseius pannonicus*, *Cheiroseius borealis*, *Cornigamasus lunaris*, *Digamasellus* sp., *Epicriopsis horridus*, *Eugamasus crassitarsis*, *Gamasodes spiniger*, *Hypoaspis* (*Gaeolaelaps*) *aculeifer*, *Iphidozercon corticalis*, *Lysigamasus armatus*, *Lysigamasus runcatellus*, *Lysigamasus runciger*, *Macrocheles carinatus*, *Macrocheles glaber*, *Macrocheles penicilliger*, *Macrocheles submotus*, *Neojordensia levis*, *Parasitus coleoptratorum*, *Parasitus fimetorum*, *Parasitus loricatus*, *Pergamasus longicornis*,

Bull. Ir. biogeog. Soc. No. 22

Pergamasus septentrionalis, *Rhodacarellus silesiacus*, *Trachygamasus gracilis*, *Typhlodromus tiliae*, *Uropoda* (*Uropoda*) *minima*, *Uropoda* (*Uropoda*) *orbicularis*, *Veigaia* sp.

(18) Monaghan (0)

(19) Offaly (11)

Alliphis halleri, *Arctoseius cetratus*, *Cheiroseius borealis*, *Cosmolaelaps claviger*, *Geholaspis* (*Longicheles*) sp., *Lysigamasus runcatellus*, *Parasitus hyalinus*, *Prozercon fimbriatus*, *Uropoda* (*Uropoda*) *minima*, *Veigaia nemorensis*, *Veigaia planicola*.

(20) Roscommon (0)

(21) Sligo (5)

Geholaspis (*Longicheles*) *mandibularis*, *Holoparasitus inornatus*, *Macrocheles submotus*, *Parasitus coleoptratorum*, *Porrhostaspis lunulata*.

(22) Tipperary (0)

(23) Waterford (1)

Paragamasus robustus.

(24) Westmeath (13)

Eugamasus berlesei, *Geholaspis* (*Geholaspis*) *longispinosus*, *Geholaspis* (*Longicheles*) *mandibularis*, *Macrocheles carinatus*, *Macrocheles dentatus*, *Macrocheles montanus*, *Macrocheles opacus*, *Macrocheles submotus*, *Macrocheles tardus*, *Parasitus beta*, *Parasitus coleoptratorum*, *Parasitus fimetorum*, *Vulgarogamasus kraepelini*.

(25) Wexford (60)

Alliphis halleri, *Amblygamasus mirabilis*, *Ameroseius corbiculus*, *Antennoseius* sp., *Arctoseius cetratus*, *Cosmolaelaps claviger*, *Dendrolaelaps foveolatus*, *Dendroseius scotarius*, *Dinychus inermis*, *Dinychus perforatus*, *Epicriopsis horridus*, *Eugamasus crassitarsis*, *Eviphis ostrinus*, *Gamasellodes bicolor*, *Gamasodes bispinosus*, *Geholaspis* (*Longicheles*) *mandibularis*, *Holoparasitus calcaratus*, *Holoparasitus stramenti*, *Hypoaspis* (*Gaeolaelaps*) *aculeifer*, *Hypoaspis* (*Gaeolaelaps*) *nolli*, *Iphidozercon minutus*, *Laelaspis astronomica*, *Lysigamasus celticus*, *Lysigamasus digitulus*, *Lysigamasus lapponicus*, *Lysigamasus misellus*, *Lysigamasus runcatellus*, *Lysigamasus runciger*, *Macrocheles dentatus*, *Macrocheles opacus*, *Macrocheles submotus*, *Minirhodacarellus minimus*, *Neojordensia levis*, *Paragamasus alpestris*, *Paragamasus robustus*, *Parasitus fimetorum*, *Parasitus hyalinus*, *Pergamasus longicornis*, *Platyseius italicus*,

Poecilochirus carabi, *Poecilochirus davydovae*, *Poecilochirus subterraneus*, *Protogamasellus hibernicus*, *Protogamasellus mica*, *Protogamasellus singularis*, *Protogamasellus* sp., *Pseudoparasitus ovatulus*, *Rhodacarellus silesiacus*, *Rhodacarus clavulatus*, *Rhodacarus* sp., *Rhodacarus strenzkei*, *Uropoda* (*Uropoda*) *minima*, *Uropoda* (*Uropoda*) *orbicularis*, *Uroseius* (*Apionoseius*) *turki*, *Veigaia agilis*, *Veigaia cerva*, *Veigaia exigua*, *Veigaia nemorensis*, *Veigaia planicola*, *Zercon triangularis*.

(26) Wicklow (20)

Eulaelaps stabularis, *Laelaps agilis*, *Lasioseius muricatus*, *Leptogamasus parvulus*, *Myonyssus decumani*, *Oplitis philoctena*, *Poecilochirus carabi*, *Polyaspinus cylindricus*, *Sejus togatus*, *Trachytes pauperior*, *Trachytes piriformis*, *Trachyuropoda coccinea*, *Trachyuropoda sinuata*, *Trichouropoda obscura*, *Uroobovella notabilis*, *Uropoda* (*Phaulodinychus*) *pulcherrima*, *Uroseius* (*Uroseius*) *acuminatus*, *Vulgarogamasus kraepelini*, *Zercon perforatulus*, *Zerconopsis remiger*.

Bull. Ir. biogeog. Soc. No. 22 (1998)

THE STATUS OF SOCIAL WASPS (HYMENOPTERA: VESPIDAE) IN IRELAND

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INTRODUCTION

Social wasps (Hymenoptera: Vespidae: Vespinae) are among the most easily recognisable (and feared) of all insects but, despite this, the knowledge of the distribution of the six species found in Ireland is still incomplete (see map showing records received, Fig. 1). The Irish social wasp fauna is relatively richer than that of other groups of Hymenoptera, possessing as it does, six of the nine species known from Great Britain. Only the Hornet (*Vespa crabro* L.) and the two recent colonists to Great Britain, *Dolichovespula media* (Retzius) and *D. saxonica* (Fabr.) are presently unknown in Ireland.

History

There has been significant, if inconsistent, activity in the past with regard to the recording of aculeate Hymenoptera (including the social vespids) in Ireland. The bulk of historic records come from the work of A. W. Stelfox and his contemporaries. Stelfox summarised all the records known to him at the time (Stelfox, 1927), and his labours form the backbone of this report.

In 1973 came the first attempt to map the known distributions of British and Irish wasps (Spradbery, 1973). Further information on the ranges of *Vespula vulgaris* (L.), *V. germanica* (Fabr.) and *V. rufa* (L.) in Ireland was gathered as a result of radio broadcast on RTE in the autumn of 1975, when members of the public were encouraged to send in material for determination along with the details of locality and date. The coordination of this considerable task fell to Dr J. Breen. The results of the Ireland-wide appeal, together with records from Dr Breen's private collection, enabled Dr M. E. Archer to publish much improved species distribution maps of all social vespids in Great Britain and Ireland (Archer, 1979). These maps were further enhanced by R. Edwards (Edwards, 1980), who added further records to the dataset.

Since Edwards' maps were published, there has been an increase in interest in the aculeate Hymenoptera, and the Bees Wasps and Ants Recording Society is attempting to map the distributions of all aculeates in Britain and Ireland. Although the majority of the recorders are based in Great Britain, there is a small, but active, nucleus of members working in Ireland, and the time has come for a re-evaluation of the status of Irish vespids. It is hoped that the publication of the updated maps will encourage further recording of these insects, most of which are almost certainly under-recorded, so that a more complete picture can be drawn when each species comes to be mapped in one of the parts of the Provisional Distribution Atlas, now in preparation.

The maps presented here are an amalgam of all previously published maps, published records from Stelfox (1927), Faris (1936) and O'Rourke (1979), Breen's dataset and from the extant collections in the National Museum of Ireland in Dublin. Added to this are casual records reported to the author from collectors either living in Ireland, or visiting from Great Britain.

Species accounts

Dolichovespula norwegica (Fabricius, 1781) (Fig. 2)

Widespread in the east and south, with records from Kerry to Wexford, and then north to Antrim and Derry. There is a single record from the Irish midlands. Apart from one record from Galway, the wasp is unrecorded from the west and north west. It is a typical "tree-wasp", constructing an aerial nest in the branches of trees and bushes (Neill, 1994). Only occasionally will nests be found in cavities. Colonies, like those of *D. sylvestris*, are not large. Males and workers may readily be found at flowers (e.g. *Cirsium arvense* (L.) Scop., (pers. obs.)) in the late summer.

Dolichovespula sylvestris (Scopoli, 1763) (Fig. 3)

Widespread and scattered throughout Ireland, but with relatively few recent records. Although O'Rourke (1979) regarded the species as extremely rare in Wexford, it is quite probably under-recorded over its entire Irish range. Although the specific epithet implies that the species nests in trees, this is not always the case, and nests are regularly constructed in a variety of cavities. The colonies are often quite small, numbering a few hundred individuals. Males (along with workers and freshly emerged queens) can be found visiting late summer flowers, especially

those of various Apiaceae.

***Vespula austriaca* (Panzer, 1799) (Fig. 4)**

A widespread species in Ireland, from Kerry to Donegal and Derry, but apparently rarely found in the midlands and not in Galway and Mayo. The concentration of old records from Cos Dublin and Wicklow reflects the activities of Stelfox in the 1920's. This is not a social species but is a brood parasite of *Vespula rufa*. Females of *V. austriaca* invade the nests of the host at a time when the first brood of workers is beginning to emerge from their brood cells. The *V. austriaca* female kills the host queen and then lays her own eggs which are subsequently reared by the *V. rufa* workers (*V. austriaca* producing no workers of its own). The species should be looked for at flowers (e.g. *Cirsium* spp. (pers. obs.)), anywhere where *V. rufa* is well established, especially in August when the males and new females start to emerge from the host nests.

***Vespula germanica* (Fabricius, 1793) (Fig. 5)**

Widespread, locally common, but almost certainly under-recorded, with clusters of records from around Dublin and Belfast. The nests are invariably constructed in cavities, particularly holes in the ground, and may be of considerable size when mature. Colonies may be large towards the autumn, and may number several thousand workers. The nest carton is greyish, which distinguishes it readily from *V. vulgaris*, which often nests in similar sites.

***Vespula rufa* (Linnaeus, 1758) (Fig. 6)**

Widespread throughout most of Ireland (including Inishbofin, Gorumna and Inishmore islands), although there are no records from the far north west. The nests are usually constructed at, or below, ground level, and so the species tends to favour drier ground for nest construction. The nest envelope is built from sound, weathered timber and so has a uniform grey coloration (cf *V. vulgaris*). It is the host of *V. austriaca*.

***Vespula vulgaris* (Linnaeus, 1758) (Fig. 7)**

Easily the best known wasp species in Ireland, with records from across the island (including the Aran Islands). It is the species most likely to be encountered in towns and cities, and, together with *V. germanica*, can cause considerable nuisance in the late summer and early autumn, when the workers are readily attracted to sugary products and rotting fruit. The species nests typically in cavities, either in the ground or in buildings or trees. The nest is constructed

from decaying wood, and so appears to be a mixture of brownish, beige and creamy shades. It is likely to be even more numerous than the map suggests.

Acknowledgements

I am grateful to Dr Jim O'Connor for encouraging me to prepare this article when I was visiting the National Museum of Ireland in the autumn of 1997. Thanks are also due to Robin Edwards for making available the data sent to him by John Breen back in 1979, which included all the post-RTE broadcast records, and to Colm Ronayne for providing me with papers written by Faris and comments on localities in County Cavan. Last, but by no means least, I must thank George Else who has read the manuscript and made helpful comments on its content.

The maps have been drawn using the DMAP mapping package developed by Dr Alan Morton.

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Figure 1: records received.

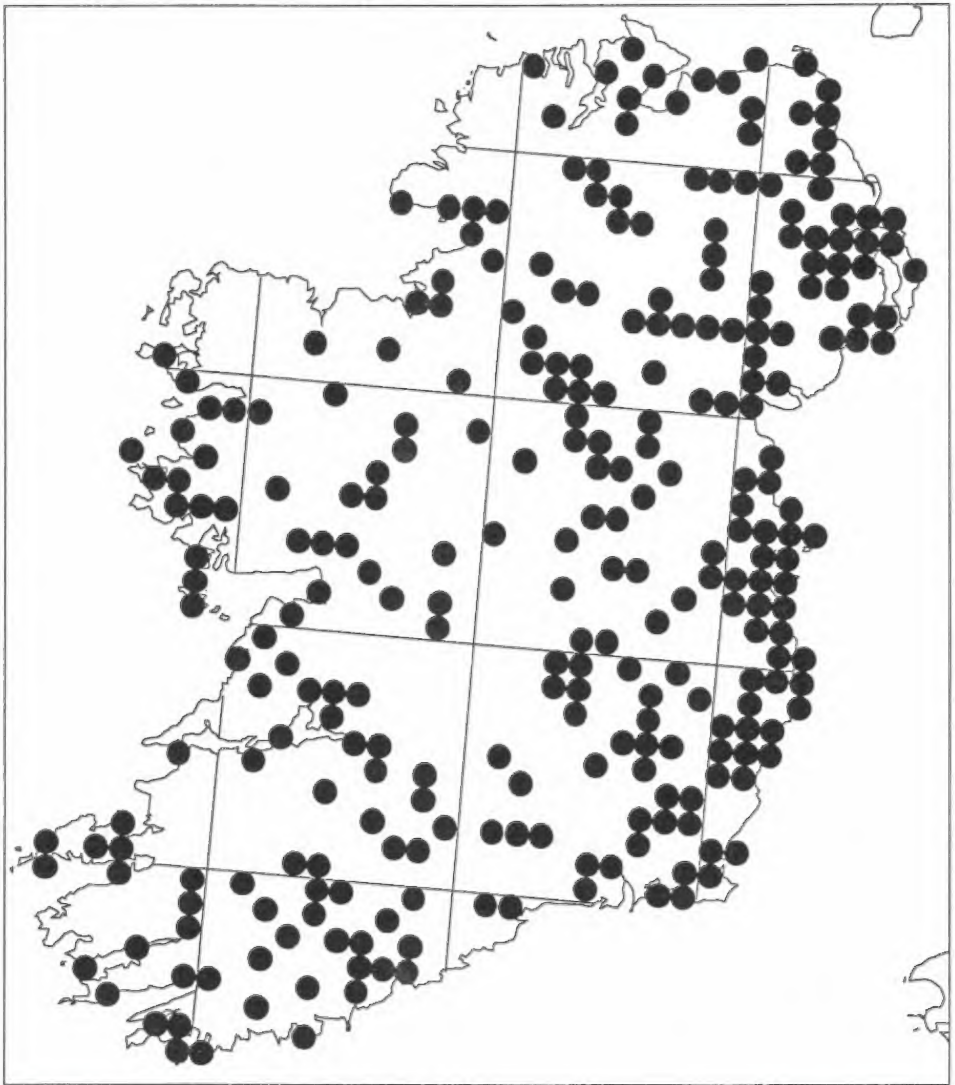


Figure 2: distribution map of *Dolichovespula norvegica* (Fabr.).

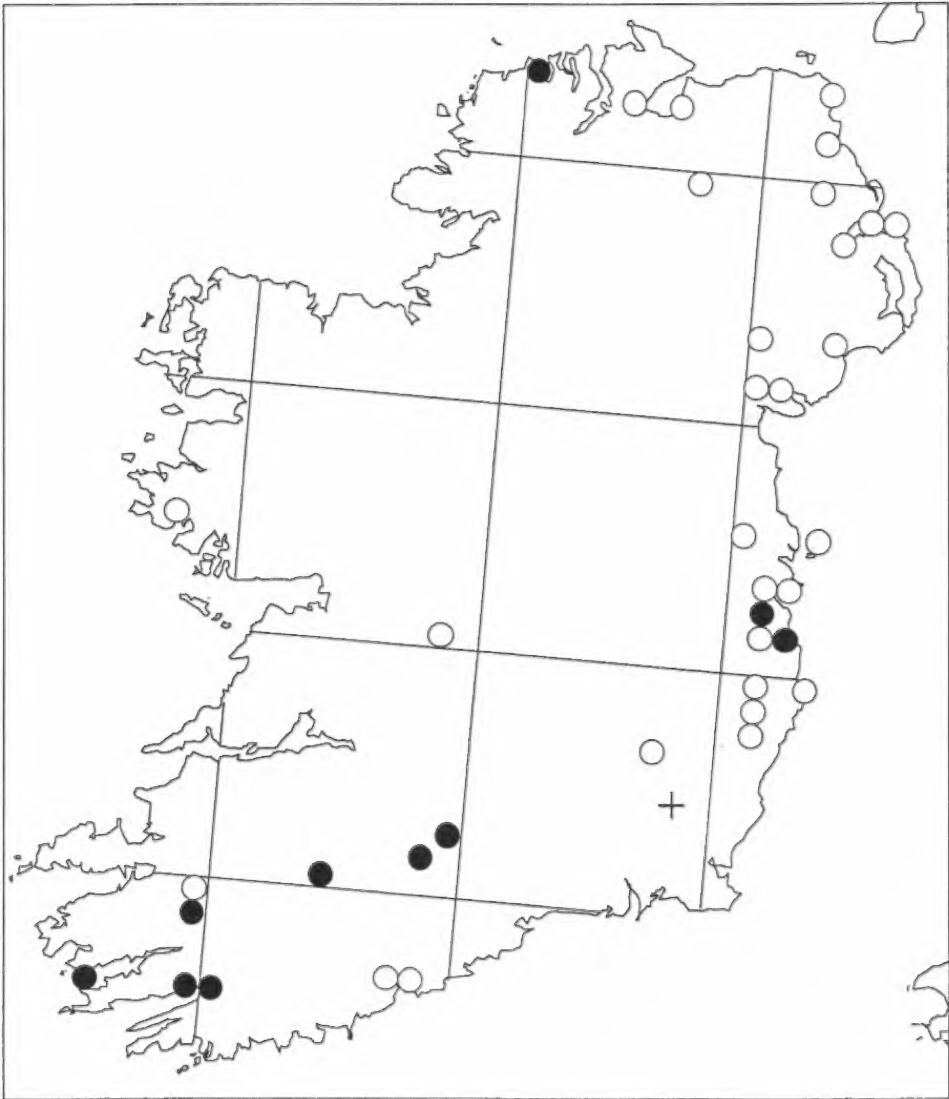


Figure 3: distribution map of *Dolichovespula sylvestris* (Scopoli).

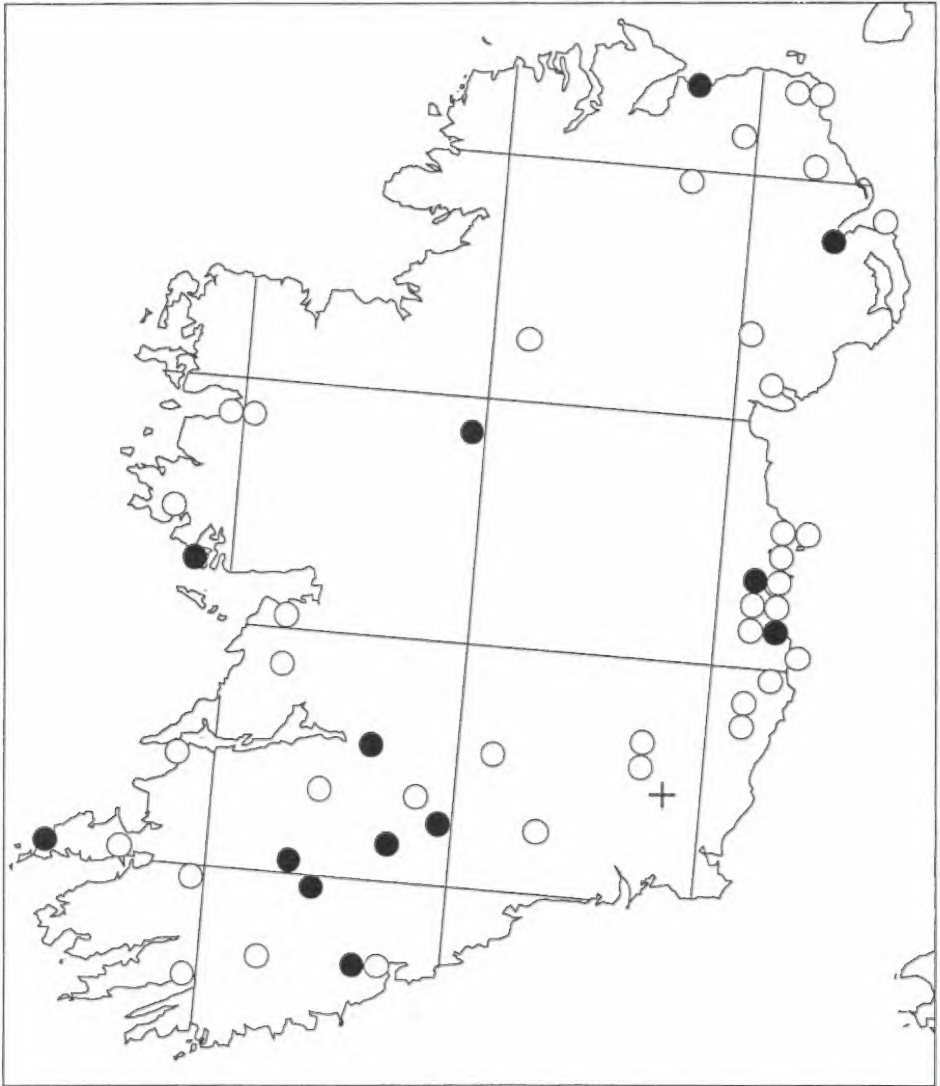


Figure 4: distribution map of *Vespula austriaca* (Panzer).

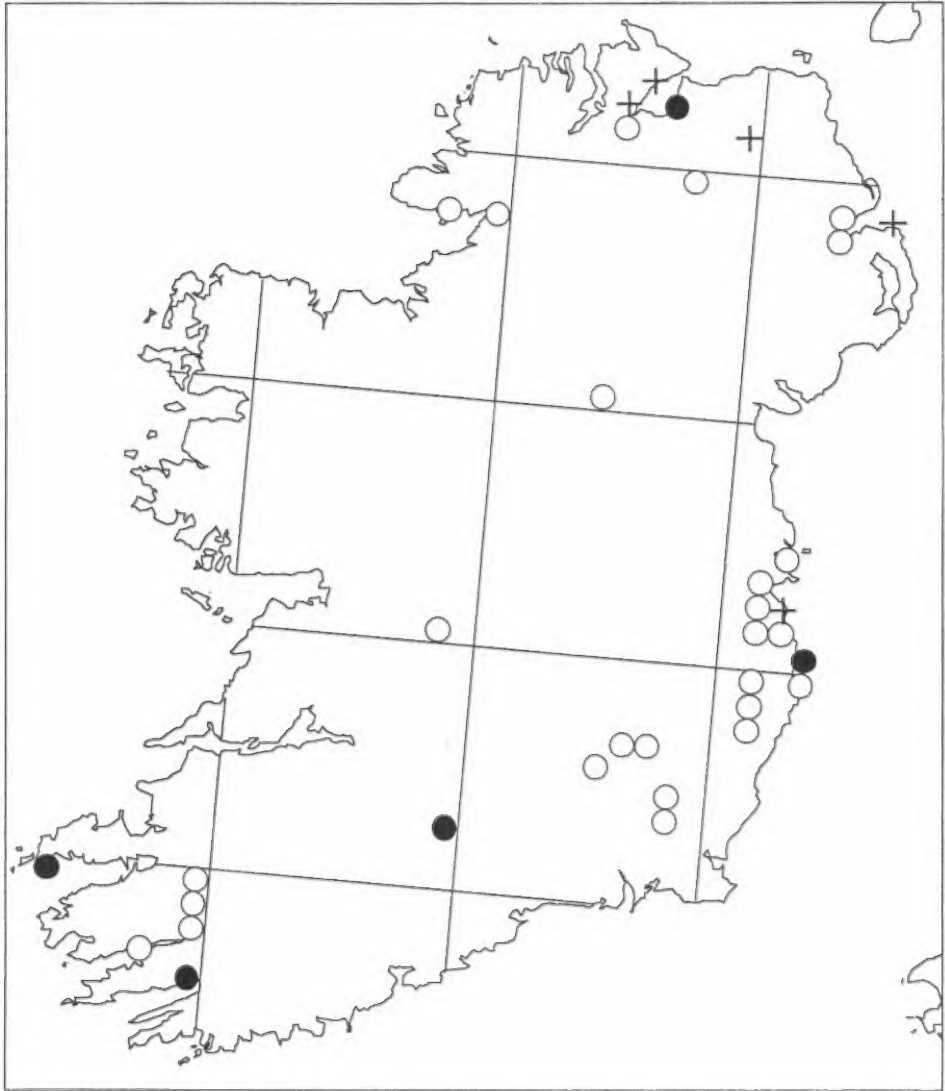


Figure 5: distribution map of *Vespula germanica* (Fabr.).

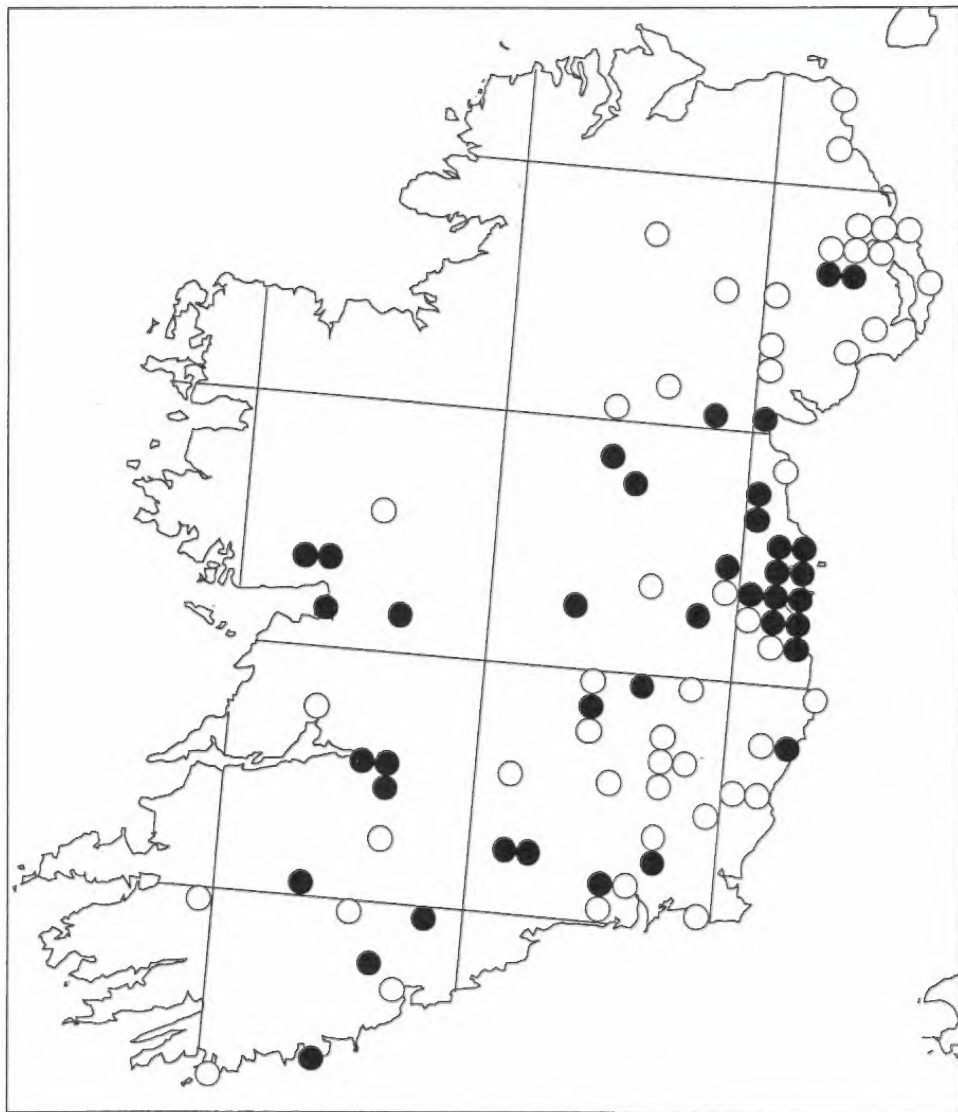


Figure 6: distribution map of *Vespula rufa* (L.).

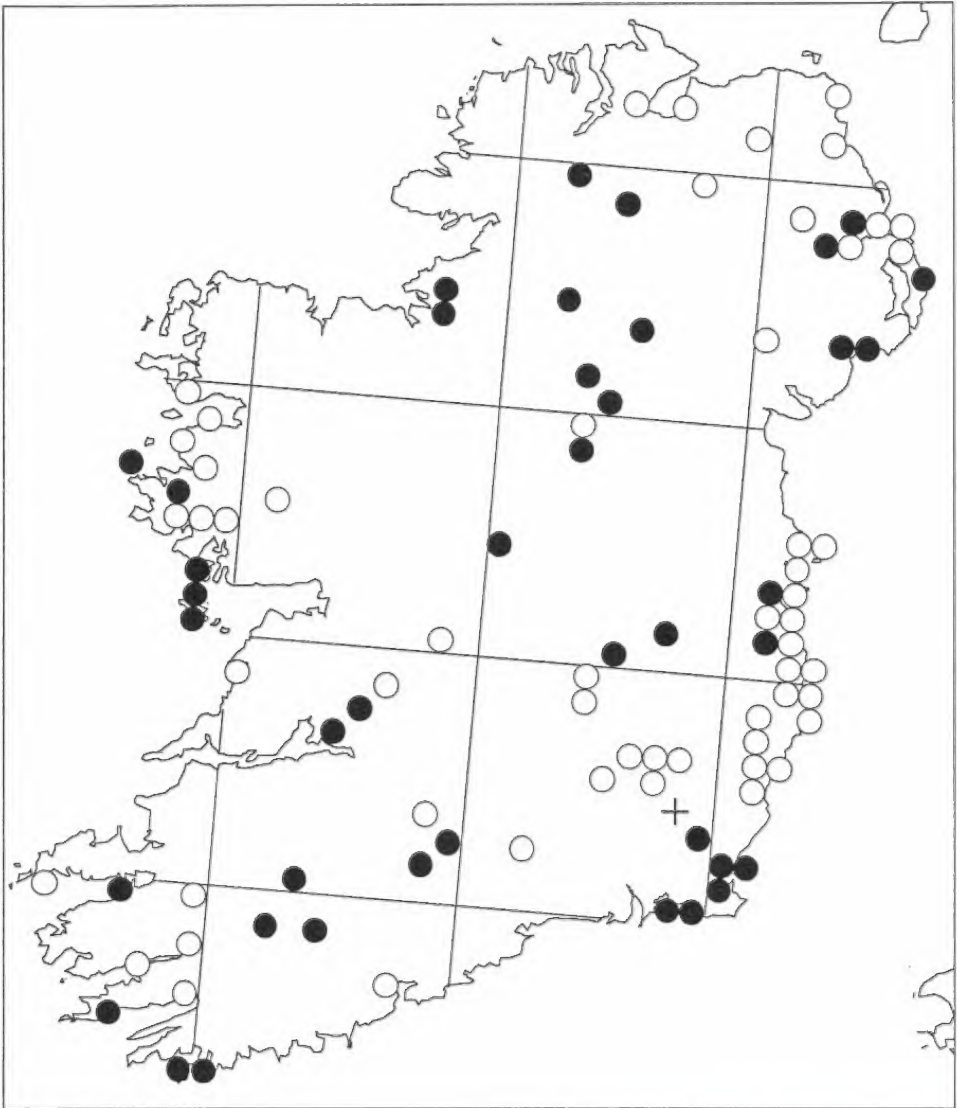
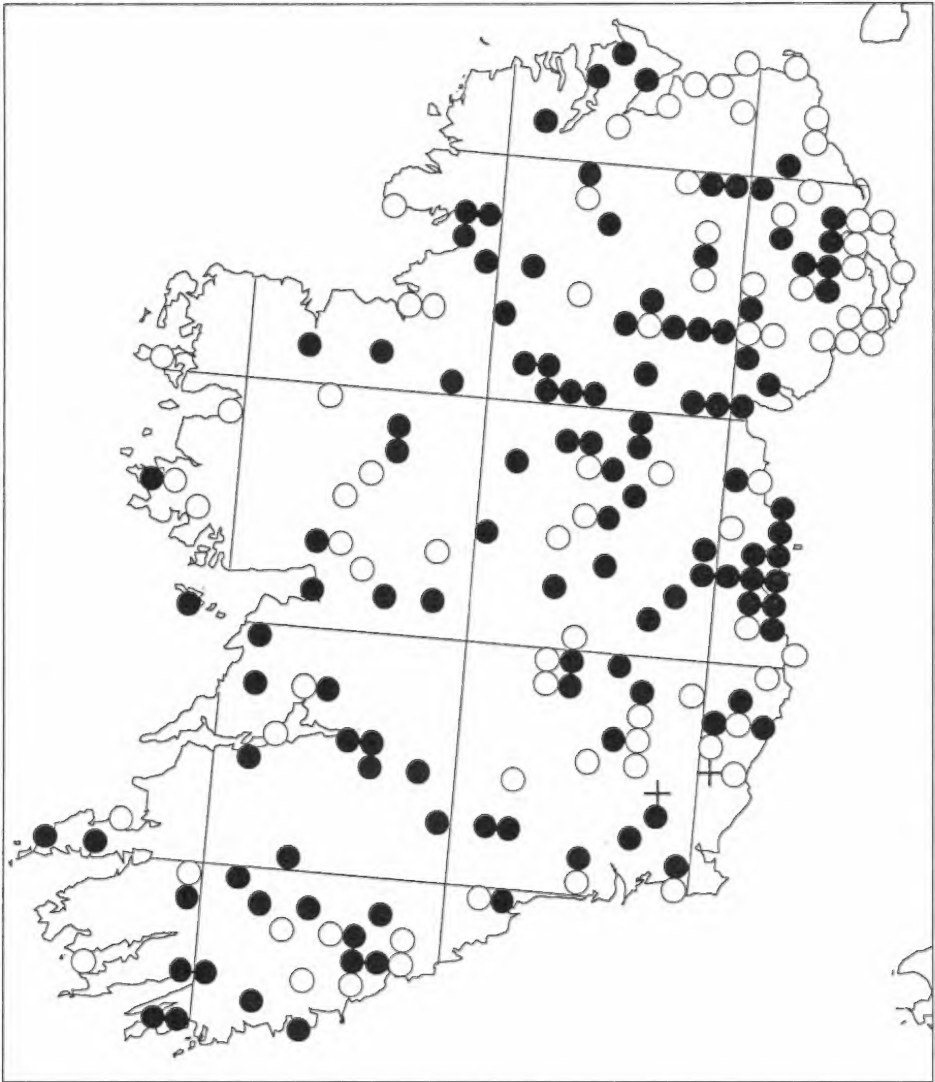


Figure 7: distribution map of *Vespula vulgaris* (L.).



Bull. Ir. biogeog. Soc. No. 22 (1998)

THE DISTRIBUTION OF THE SMOOTH NEWT, *TRITURUS VULGARIS* L., IN IRELAND

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Introduction

The smooth newt (*Triturus vulgaris* L.) is one of only three amphibians found in Ireland. The other two are the common frog (*Rana temporaria* L.), and the natterjack toad (*Bufo calamita* Laurenti). Although the newt is considered native (Wilson, 1986), the origins of the two anurans are uncertain.

Distributional records of the smooth newt appear in the earliest volumes of the *Irish Naturalist* (Lett, 1892; Scharff, 1895) and the *Proceedings of the Dublin Natural History Society* (Kinahan, 1860). The first map to show the vice-county distribution of the animal was published by Taylor (1948). This collation of sightings suggested that the newt was mostly confined to the mid-west of the country, but was also found around the main population centres of Belfast, Cork and Dublin. In an updated version 15 years later (Taylor, 1963), most of the new records were centred on Lough Neagh in the north-east with just a few other sightings from around the island. In 1974, a map was produced by the Irish Biological Records Centre showing all the records from 1950-73 (Crichton, 1974). The newt still appeared to be far from common, but the distribution was less evidently clustered. The last atlas to show the distribution of the smooth newt in Ireland was edited by Ní Lamhna (1979). She believed that the newt was widespread over much of the country, but not commonly recorded and so appeared rarer than it probably was.

It seems likely that these distribution maps of the newt in Ireland were as much representations of the spread of the activities of recorders around the country as of the animal itself. This situation is by no means singularly Irish; in Britain, the distributional changes of the common amphibians over the last 50 years as seen in the national distribution maps (e.g.

Taylor, 1948; Arnold, 1995) can be largely explained by the increase in recording effort (Beebee, 1996). To achieve a better understanding of the true distribution of the smooth newt in Ireland, an objective survey was required. Equally, while there is concern about the loss of breeding waters due to pollution, infilling of gravel pits and peat extraction, without a baseline field survey the true extent of this problem will remain unknown (Corbett, 1989). The present work was carried out in an objective and systematic way in an attempt to overcome the shortcomings of the previous maps and to provide baseline information for the distribution of the newt in Ireland. In addition to this study, anecdotal information on recent newt sightings was also examined.

Methodology

Because of the inevitable constraints of time and money, only a small proportion of the island could be surveyed. In an effort to make this fraction as representative and unbiased as possible, a semi-random sub-sampling technique was used. The pattern of Ordnance Survey squares used was based on that of the National Otter Survey of Ireland (Lunnon and Reynolds, 1991) and provided a comparable coverage to that used in recent monitoring schemes of the Botanical Society of the British Isles (Rich and Woodruff, 1990). It involved the study of alternate 50km squares across the national grid and the selection of three 10km squares in each 50km square so as to give an even spread of surveying effort. This pattern yielded 50 x 10km study squares in the Republic of Ireland with a further 10 in Northern Ireland, covering approximately 6% of the island (see Fig. 1).

The fieldwork was carried out over the springs and summers of 1993 and 1994. Within each square, the author attempted to find and sample six potential newt breeding sites. This was achieved by driving along roads and tracks looking for ponds and ditches. If I failed to find six sites this way, I walked to examine likely marshy areas or to investigate whether more remote ponds marked on the old 6" O. S. maps still existed. In several squares it was not possible to find six sites because of topography, land drainage or, at certain coastal sites, owing to the large area of sea within the study square. While the first two factors were judged to be valid reflections of potential habitat, the final problem was seen to be a consequence of the sampling methodology and as a result might have unfairly affected the distribution findings. To counter

this, the four coastal squares containing large areas of sea (G65, V59, W43 and X59) were replaced by adjoining land-locked squares (G64, Q50, W44 and S50 respectively). These final four squares were sampled during the early summer of 1995.

Although trapping is the most effective method of detecting newts (Griffiths *et al.*, 1996), this technique requires two visits to each pond and was therefore not practicable due to the time constraints of the present study. Instead a combination of dip-netting and egg searches was employed at each site. In most parts of Europe, egg searches are of little use when surveying for small newts because *T. vulgaris* and *T. helveticus* Razoumowsky (Palmate newt) eggs are indistinguishable in the field (Griffiths and Raper, 1994). As the palmate newt is not present in Ireland this problem does not arise and consequently a combination of egg searches and dip-netting is a very effective surveying methodology for newts.

In total, 278 sites were investigated in sixty 10km squares. Each site was netted for approximately half an hour using a 2mm mesh hand-net, and aquatic vegetation was examined for newt eggs. Once any life stage was found, the pond was deemed positive and no further sampling was conducted. Large waterbodies (>5000m²) were generally avoided during the survey because of the difficulties involved in sampling them effectively for newts.

In an effort to obtain as much information as possible on the current range of the newt around the country, recent newt sightings (ie. since 1980) were actively sought from wildlife rangers, individual naturalists, the Department of Environment (Northern Ireland), the Biological Records Centre at Monk's Wood, England, and from the general public through radio interviews and notices in wildlife newsletters, newspapers and *The Irish Naturalists' Journal*.

Results

Twenty four out of the 60 squares surveyed (40%) proved positive for newts (Fig. 1). Most of the positive squares were in the midlands, but the north-east also proved to be a stronghold. Except for one square near Bantry, Co. Cork, all the sites sampled in the south-west (below a line from the Burren to Hook Head) were negative. The Counties of Donegal, Fermanagh and Tyrone in the north-west also failed to produce a positive site.

Of the 278 individual water bodies investigated, 36 (13%) were found to contain newts. All aquatic life stages were recorded: 17 ponds contained adult newts; 15 harboured tadpoles; and

eggs were located at seven sites. Terrestrial adults were also recorded under logs at two sites.

Over 100 newt records were received in response to the public request for sightings, most of them from professional biologists. A large percentage of these were for the Dublin-Wicklow area, but the dedicated work of two naturalists in Co. Sligo meant that this area of the north-west was very well represented (Fig. 2). This also gives an indication of the effect that recorder distribution can have on a survey.

Discussion

Although dip-netting is the most commonly used technique in amphibian surveying and is considered by many herpetologists to be the best method for detecting adult and larval smooth newts (Griffiths and Raper, 1994), recent investigations by Griffiths *et al.* (1996) have shown that dip-netting may be only 58% effective in locating this species (compared to 66% for torching and 87% for trapping). The efficacy of egg-searching in crested newt surveys is given as 58% in the same report, but the authors do not provide an estimate for the usefulness of this method for the small bodied newts. The smaller size of smooth newt eggs presumably lowers the success rate of this method. A survey of active herpetologists in Britain (Griffiths and Raper, 1994) indicated that egg-searching was found to be about half as effective in locating smooth newts as netting. Even a combination of these two methods therefore, as used in the present study, is likely to overlook some newt populations, although it is difficult to assess to what extent false negatives have been recorded.

The pattern of positive squares identified in the objective survey suggests that the smooth newt is particularly widespread in and around the midlands, from Cavan to Kilkenny and east Galway to Wicklow. It is also well represented in the north-eastern Counties of Down and Antrim.

Records received from naturalists and anecdotal information in response to public appeals produced a more clustered distribution and, although records have been received from all over the island, there appears to be a noticeable concentration of sightings in the east, in the Sligo area and from around Co. Down. Ní Lamhna (1979) also recorded concentrations of sightings from the north-east and the greater Dublin area. In contrast, few records were received from the public for the midlands of the country, although most of the squares surveyed there were

found to be positive. These patterns appear to an extent to reflect human population density and the availability of recorders and provide a good example of one of the benefits of the systematic and objective survey approach.

Judging by the results of both the objective and public surveys, the newt would appear to be largely absent from the south-west (Cork, Kerry, south Tipperary and Waterford), as was also suggested by Ní Lamhna (1979). Besides two ponds near Bantry, Co. Cork, with seemingly thriving newt populations, not a single positive site was encountered during the survey south-west of a line from the Burren in Co. Clare to Hook Head in Co. Waterford. The south-west has a high density of recorders (Ní Lamhna, 1979) and the dearth of sightings suggests that the scarcity of the newt in the south-west may be real. The north-west (Donegal, Tyrone and Fermanagh) returned similar results. As long ago as 1860, Kinahan (1860) also remarked on the smooth newt's absence from Cork and Kerry; he equally failed to record it in the north-west.

Six counties returned no records of smooth newts - Carlow, Limerick, Longford, Meath, Monaghan and Tyrone. However, this is probably due to under-recording; the likelihood is that newts are not entirely absent but are present in low numbers, in isolated and localised pockets. It seems probable in fact that the smooth newt is to be found in every county in Ireland.

The results of both surveys show that the smooth newt is indeed more widespread in Ireland than any previous distribution atlas has shown. Altogether, 121 of the 10km squares have recorded sightings of newts since 1980 and the vast majority of these records come from the last ten years. The previous distribution atlas (Ní Lamhna, 1979) showed the newt had been recorded in 93 squares over the 28 year period from 1950 - 1978.

The status of the newt in Co. Sligo (Fig. 2), as revealed by the dedicated work of two local biologists (Dr Don Cotton and Dr Martin Cawley), is markedly different from the situation further north and also in the south-west. As the surveying effort has been intensive in this area compared to the rest of the country, it would appear that the newt in some areas may be much less localised than has been thought to date.

Some comparisons can be drawn between these distribution results and findings from more detailed, small-scale investigations in Britain. The Midlands of Ireland, where the newt seems to be most common, are dominated geologically by Carboniferous limestone (Mitchell, 1986)

(Fig. 3). Yalden (1986) found the smooth newt to be more common in the Carboniferous limestone regions of the Peak District. Cooke and Frazer (1976) noted the animal's preference for mineral rich ponds, particularly water high in calcium.

Beebee (1985) found smooth newt distribution to be positively associated with recent geological substrates and Ildos and Ancona (1994), who investigated habitat features of *T. vulgaris meridionalis* Boulenger breeding sites in Northern Italy, also calculated that 'age of geological substrate' showed a strong negative correlation with smooth newt distribution. Post-carboniferous sedimentary rocks have survived erosion in Ireland in few places. Noteworthy exceptions are in the north-east of the island (Nevill, 1974). The largest surviving area of tertiary basalt is also in the north east - the Antrim Plateau. Conversely, the most extensive outcrop of basement rocks to be found in Ireland - the schists, gneisses and quartzites of the Dalradian period - occurs in the north-west (Nevill, 1974). Ildos and Ancona (1994) believed that the importance of the geology was explained by its impact on the quality and quantity of inorganic ions available to plants. It would be foolhardy to attempt to explain the distribution of the smooth newt in Ireland on the basis of any one parameter alone, but the geological structure of a region has considerable influence on the soils and groundwater that overlie it and, superficially at least, there appears to be some general correlation between the distribution of the smooth newt in Ireland and the geological substrate.

A brief examination of Irish geomorphology may also help explain some of the distributional findings. A large portion of both the south-west and north-west of the island, where the newts appear to be most rare, are dominated by uplands (Herries Davies and Stephens, 1978; Mitchell, 1986) (Fig. 3). Smith (1969) reported that the smooth newt was common and widely distributed over much of England, but owing to the hilly nature of both Wales and Scotland was more local in its distribution in those parts. High rainfall is also a feature of these areas and this fact, in association with their acidic underlying geology, maximises soil podzolization, leaving the soils impoverished of minerals (Nevill, 1974). This may also help explain to some extent the general scarcity of newts in the upland regions of the north-west and the south-west, as previous studies have found a positive relationship between mineral rich water and the presence of smooth newts (Cooke and Frazer, 1976). Large areas of Donegal and Kerry are also dominated by moorland and bog (Smal, 1995). A negative association between bogland and

smooth newts has been previously demonstrated (Marnell, 1998).

Lakes are a common feature of the landscape of these regions however, and it should not be overlooked that lakes were generally eschewed during the present survey because of the considerable difficulties involved in sampling them with any degree of efficiency. The smooth newt, therefore, may be more widespread in the south-west and north-west than it appears from this survey, if it exploits the lacustrine habitat. There is little evidence from other parts of the animal's European range, however, to suggest that it is well adapted to this habitat (Dan Cogaliceanu, pers. comm.).

Habitat loss was the most frequently cited explanation for amphibian declines in a survey of herpetologists and wildlife biologists in Britain (Hilton-Brown and Oldham, 1991). The decline of ponds in Britain has been well documented - an estimated 75% of ponds have been lost there during the last 100 years (Oldham and Swan 1993). No similar survey has been undertaken for Ireland and although complete records of the number of lost water bodies (i.e. those that appeared on the 1900 - 1910 6" O. S. maps but were not found during the present newt survey) were not kept during the present survey, a review of field notes suggests that approximately 50% of ponds had disappeared, with some squares incurring a much higher rate of loss. These losses are probably largely attributable to the well-funded programme of land drainage that has been actively promoted in Ireland. In the Land Project which ran from 1944 to 1974, over one million hectares were subject to field drainage, arterial drainage or land reclamation. The Farm Modernisation Scheme (1974 - 1985) provided aid to 100,000 farmers for field drainage and scrub clearance. In addition, during 1979 - 1988, farmers involved in the Western Drainage Scheme received 70% funding towards field drainage over a further 150,000 hectares (all figures from the Department of Agriculture, Food and Forestry).

The extent of the destruction of terrestrial habitat suitable for amphibians is even more difficult to gauge. Once again, the expansion of agriculture into areas of marginal land, and the clearance of scrub and wild areas that such developments necessitate, have undoubtedly accounted for large tracts of wilderness, some of which would have harboured newt populations. The fragmentation of suitable habitat and the interruption of wildlife corridors such as hedgerows, inevitably lead to the isolation of populations of relatively sedentary animals such as the smooth newt. In The Netherlands, Laan and Verboom (1990) reported that the

creation of a landscape which holds small islands of habitat surrounded by oceans of inhospitable farmland inhibits dispersal, thereby reducing the rate of recolonisation and increasing the chances of local extinctions. It seems reasonable to surmise that the loss of habitat has probably been the cause of local extinctions of newt populations in many parts of Ireland.

This paper has detailed the results of an extensive and objective field survey of the smooth newt in the island of Ireland and an overall impression of the distribution of this elusive amphibian has been produced for the first time. Some possible explanations for the apparent distribution are also proposed. More detailed studies are required, however, to firmly establish the regional variation highlighted by this study, and investigations at local level will be necessary before site-based conservation measures, which are now the standard approach in amphibian conservation, can be considered.

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Figure 1: distribution of *Triturus vulgaris* in Ireland: results of the survey, 1993 - 1995.

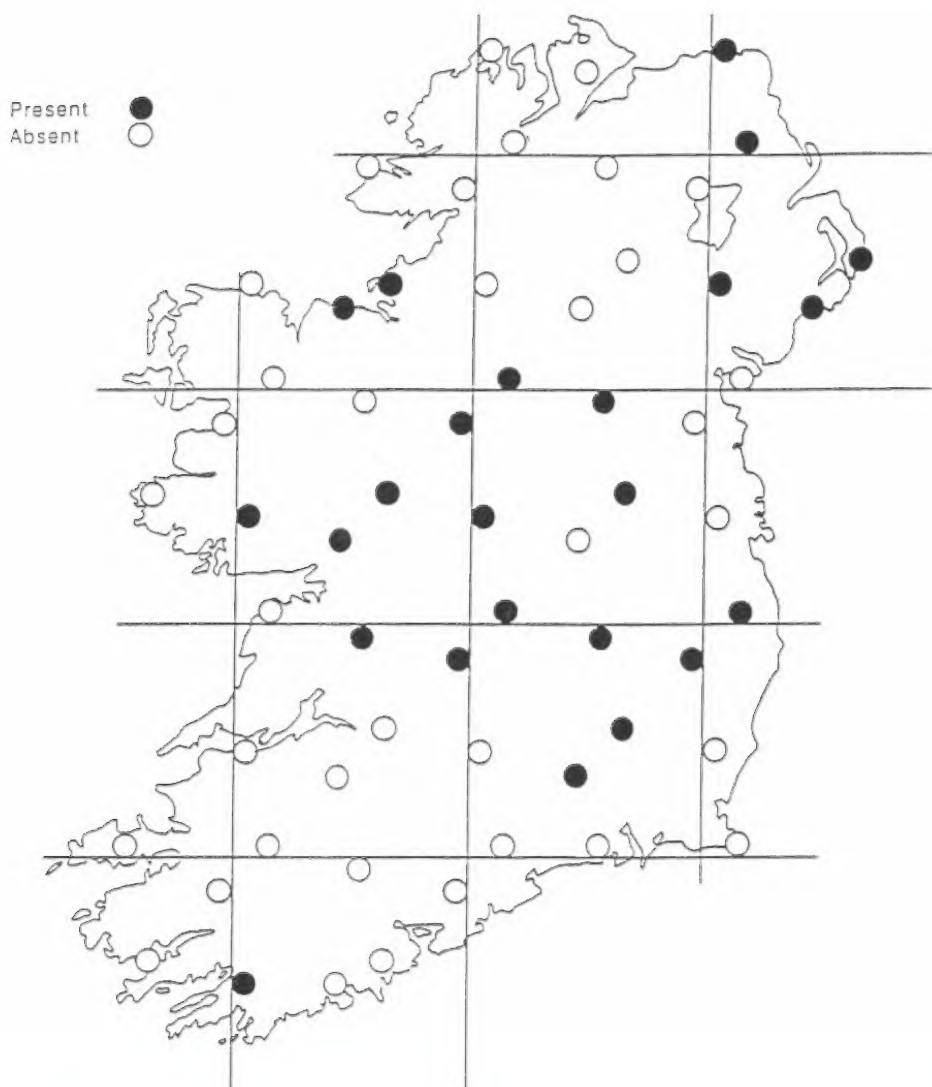


Figure 2: distribution of *Triturus vulgaris* in Ireland: records from the public, 1980 - 1996.



Figure 3: Map of Ireland showing extent of Carboniferous Limestone and land over 150m.



Bull. Ir. biogeog. Soc. No. 22 (1998)

ECTEMNIUS CEPHALOTES (OLIVIER) (HYMENOPTERA: SPHECIDAE), AN ACULEATE WASP NEW TO IRELAND

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Introduction

Four species of the genus *Ectemnius* have been previously reported from Ireland. Stelfox (1927) recorded three of the species viz. *Ectemnius cavifrons* (Thomson) (as *Clytochrysus cavifrons* Thomson), *E. continuus* (Fabricius) and *E. lapidarius* (Panzer) (as *Clytochrysus chrysostomus* Lepeletier). Richards (1980) includes Ireland (Antrim) in the distribution of the fourth species (*E. ruficornis* (Zetterstedt)). The origins of this record are unknown. Since no voucher material can be traced and there have been no further Irish reports of the species, the record must be treated as unsubstantiated (Nelson, pers. comm.). In this paper, a further species (*E. cephalotes* (Olivier)) is added to the Irish list.

Ectemnius cephalotes is widely distributed and often frequent in England and Wales but rare in Scotland (Falk, 1996). It is rare in Fennoscandia and Denmark (Lomholdt, 1984) but occurs as far south as North Africa and east to the Urals. It is also recorded from south-east Canada and north-east United States, where it may have been introduced.

Nine Irish records of the species are given here. The details are followed by a brief comment on the context of the record. All the specimens were collected and determined by the author. The material was identified using Lomholdt (1984) and the nomenclature follows that work. Place names are those shown on Sheet 13 (Meath) of the 1:126,720 series of maps published by the Ordnance Survey of Ireland.

The records

(1). DUBLIN (H21): Skerries (O247597), a ♀ hand-netted while flying near raspberry (*Rubus idaeus*) bushes in a suburban-type garden, 14.ix.1996, specimen in author's collection.

This is the first record of the species from Ireland. The circumstances leading to the specimen's capture are worth recording. Other specimens of *Ectemnius* were seen in the garden on the preceeding day. Because of their size, they were assumed to belong to *E. cavifrons*

which occurs regularly in the garden. The author's curiosity was aroused when three or four of the *Ectemnius* hovered very close to him. Indeed, one female hovered at his nose - just beneath a nostril while another individual investigated the shadow at the entrance to the pocket of his jeans. All appeared to be searching for possible nest sites rather than for prey or nectar. They had also been observed looking at a timber panel fence containing knot holes and some trap-nest bundles set up for *Megachile* spp. (Hymenoptera: Apidae). None visited a large fennel (*Foeniculum vulgare*) plant which was attracting hoverflies (Diptera: Syrphidae) and solitary bees (*Hylaeus* sp. and *Halictus* spp.). The author had no means of capturing any of the specimens on that day. On the following day, the author returned with a hand-net but the weather was poor. As a result, only one specimen was seen but it was caught and identified as *E. cephalotes*. While examining it under the microscope, it was noted that many of the interstices of the head and thorax were filled with a fine dark wood-dust, suggesting recent nest-related activities. Despite intensive observations at the site, no further sightings of the species were made during 1997.

(2). MEATH (H22): Herbertstown Bridge, west of Greenanstown (O114637), a ♂ flying at the base of an ivy (*Hedera*) covered stone bridge in a wooded stream-valley, 5.vii.1997, specimen deposited in the National Museum of Ireland, Dublin.

The specimen of *E. cephalotes* was flying with *E. cavifrons* (3♂♂) and *Crossocerus dimidiatus* (Fabricius) (♂♂) (Hymenoptera: Sphecidae) in the stream-valley which contains small areas of marshy scrub woodland and some mature oak (*Quercus*) trees.

(3). MEATH (H22): Thomastown Bog, near Drumman House, west of Duleek (O008687), a ♀ in a Malaise trap, sample 3, 19.vi-7.vii.1997, specimen in National Museum of Ireland, Dublin.

The Malaise trap was situated in damp woodland growing on cutover basin bog.

(4). Data as for (3) except the ♀ was taken in sample 4 on 7.vii-25.vii.1997 and is in the Ulster Museum, Belfast.

(5). MEATH: Drumman House, west of Duleek (O007689), ♀ hand-netted while flying around brambles close to a large stump of ash (*Fraxinus excelsior*) in a hedge, 7.vii.1997, specimen in the Ulster Museum, Belfast.

At the time of the capture, large numbers of *Sinodendron cylindricum* (L.) (Coleoptera:

Lucanidae) were emerging from burrows in the stump. In addition, two species of sphecid wasp (*Passaloecus monilicornis* (Dahlbom) and *Pemphredon lugubris* (Fabr.)) were also caught entering and emerging from holes in the stump.

(6). Locality as in (5). ♀ hand-netted at an ivy-covered tree in a boundary pasture-hedge, 6.viii.1997, specimen in the author's collection.

Both *P. monilicornis* (♂♀) and *P. lugubris* (♂) were caught at the same time.

(7). Locality as in (5). ♀ nesting in an ash stump in a hedge, 20.viii.1997, specimen in the author's collection.

This is the stump mentioned in (5). Between circa 5.30 - 5.50 p.m., at least four females were seen to enter the same entrance hole at the base of the stump carrying prey (muscid) in succession before one of them emerged. That female spent fifteen minutes inside. Another individual entered a hole in an outlying root of the stump approximately 2m from the first entrance but it is unknown if this was a separate nest. Although specimens had been previously noted flying close to the stump, this was the first time that nesting could be confirmed. The weather conditions were overcast and cool (13-14°C) with a strong breeze from the south-west.

(8). Locality data as in (5). 2♀♀ observed nesting in the above stump, 9.ix.1997.

Two females were noted landing and entering at the first entrance hole mentioned above. Since the previous visit, cattle had broken the main stump into a number of large pieces. Although this destruction had not directly affected the entrance hole to the nest, its future survival is doubtful especially if the cattle continue to be present. On a final visit (31.ix.1997) to the site, no specimens were seen despite favourable weather conditions.

(9). MEATH (H22): River Boyne, upstream of Oldbridge (O043748), ♂ on a flower of *Angelica sylvestris* in a damp ditch beside the river, 7.viii.1997, specimen in the author's collection.

Ectemnius cavifrons (♂♀) were collected in the same locality.

Discussion

Ectemnius cephalotes is a medium sized (9-17mm) wasp, about the same size as a small vespid worker. The adults have the same distinctive yellow and black warning colouration. The species is readily distinguished from other Irish members of the genus by the presence of

distinct transverse striations and the absence of punctation on the anterior third of the scutum. This character is common to both males and females.

The question arises as to whether *E. cephalotes* is a recent addition to the Irish fauna or whether it was previously unrecognised in Ireland. Although Stelfox (1927) recorded Aculeate Hymenoptera from north Dublin (including Skerries) and east Meath (including Ford of Fine, just 3km south of Herbertstown Bridge), he did not report the species. However he concentrated primarily on coastal and sand/gravel pits - areas in which *E. cephalotes* is less likely to occur.

Hamm and Richards (1926) has also noted several females of *E. cephalotes* using a common nest entrance. In addition, a nest in a birch (*Betula*) trunk is figured by Lomholdt (1984, p. 18, Fig. 9) who also reports that the species often forms large nesting aggregations. Several other sphecoid wasps (*Crossocerus dimidiatus*, *C. megacephalus* (Rossius) and *Ectemnius cavifrons*) have been observed sharing common nest entrances (Lomholdt, 1984).

The behaviour reported in record (1) has not been previously observed by the author and he is unaware of any published accounts of similar nest searching - if the observation has been correctly interpreted. It is evident from record (7) that at least four females will use a common entrance. It is not known if these four females originated in this same communal nest, or whether any of them were siblings. If not, how do such communal nests arise? These questions must remain open until more is known of this species biology.

Postscript: The *Fraxinus* stump in which this communal nest (Records 7 and 8) was located had been completely demolished by cattle by early summer 1998.

During the summer of 1998 the author saw only a single specimen of *E. cephalotes*.

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Bull. Ir. biogeog. Soc. No. 22

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Bull. Ir. biogeog. Soc. No. 22 (1998)

THE CRANEFLIES (DIPTERA) OF IRELAND. PART 2. LIMONIIDAE: LIMONIINAE

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Abstract

The Irish fauna of Limoniinae currently consists of 40 species of which three species, *Achyrolimonia decemmaculata* (Loew), *Dicranomyia* (*Dicranomyia*) *aperta* Wahlgren and *Dicranomyia* (*Glochina*) *sericata* (Meigen), are recorded here as new to Ireland. An additional three species, for which there are only old (19th century) published records, are excluded from the Irish list because no preserved material appears to exist which would enable their identities to be confirmed.

Introduction

This is the second of a series of papers, the first being Ashe *et al.* (1995), which aims to provide a detailed review of the records, literature and distribution of all the Irish crane-fly species. A checklist of the Irish species of the family Limoniidae was recently published (Ashe *et al.*, 1998) but it does not include the three species reported here as new to Ireland.

In the earliest account which includes Irish Limoniinae, Haliday (1833) recorded 16 species: *Dicranomyia modesta* (Meigen), *D. chorea* (Meigen), *D. lutea* Meigen, *D. inusta* (Meigen) (erroneously as *musta*) [misidentified = *Limonia macrostigma* (Schummel)], *D. oscillans* Haliday [= *didyma* (Meigen)], *Glorhina leucocephala* (Meigen) [= *Dicranomyia* (*Melanolimonia*) *morio* (Fabricius)], *G. dumetorum* (Meigen) [= *Neolimonia dumetorum*

(Meigen)], *Geranomyia unicolor* Haliday, *Rhamphidia longirostris* (Meigen) [= *Helius longirostris* (Meigen)], *Limnobia tripunctata* (Fabricius) [= *Limonia phragmitidis* (Schrank)], *Limnobia nubeculosa* (Meigen) [= *Limonia nubeculosa* Meigen], *Limnobia xanthoptera* (Meigen) [= *Metalimnobia (Metalimnobia) bifasciata* (Schrank)], *Limnobia quadrinotata* Meigen, [= *Metalimnobia (Metalimnobia) quadrinotata* (Meigen)], *Rhipidia maculata* Meigen, *Limnobia albifrons* Meigen [= *Limonia albifrons* (Meigen)] and *Limnobia pabulina* Meigen [= *Limonia pabulina* (Meigen)]. Although *L. albifrons* and *L. pabulina* are valid species (Savchenko *et al.*, 1992) neither is known to occur anywhere in the British Isles and it appears that Haliday (1833) misidentified them and their true identities are unknown.

The records for Ireland given in Walker (1856), except for *Limonia stigma* (Meigen) - see below, are probably all based on Haliday (1833). The few other published 19th century Irish records are included in Hogan and Haliday (1855), Haliday (1857) and Carpenter (1895). There are three species recorded as Irish in the 19th century literature for which no museum reference material apparently exists and these species are excluded from the list because they are doubtful and require confirmation - the species are: *Dicranomyia (Idiopyga) stigmatica* (Meigen) recorded in Hogan and Haliday (1855, sub *Glochina*), *Limonia maculipennis* (Meigen) in Carpenter (1895, sub *Tipula*) and *Limonia stigma* (Meigen) in Walker (1856).

Mendl (1987) produced what was then the single most important paper on the Irish Limoniidae which included many records of Limoniinae, several of which were new to Ireland and one, *Orimarga attenuata* (Walker), was new to the British Isles. The 20th century literature, prior to Mendl (1987), usually included from one to at most a few Limoniinae records but there have been a few papers since 1990 that contain quite a few records including Hancock (1990), Ashe *et al.* (1991) and Blackith *et al.* (1991). Some records from Irish caves are given in Hazelton (1974a, b, c) including the first record for *Lipsothrix remota* (Walker). In Ashe *et al.* (1991) seven species of the subfamily Limoniinae were added to the Irish list and subsequently Ashe and O'Connor (1993) added the rare marine species *Geranomyia bezzii* Alexander and Leonard.

A separate entry is included for the *Dicranomyia (D.) mitis* (species complex) because it has not yet been possible to assign every record of *D. mitis* to the correct species of the complex.

Materials and Methods

The Irish national grid reference (six, four or two figure reference) is included where possible followed by the Universal Transverse Mercator (UTM) 50km grid reference in parenthesis. The method used to obtain the UTM references is described in Rasmont *et al.* (1986). The data included in Mendl's (1987) work on Irish species are not repeated in detail but the relevant UTM grid references have been calculated for each record and incorporated into the distribution maps. The nomenclature for the Limoniinae in general follows Savchenko *et al.* (1992) apart from any more recent changes included in Chandler (in press). Species were identified using Coe (1950) and an unpublished key prepared by P. Ashe.

List of collectors and abbreviations used for collectors' names

P. Ashe = PA; B. P. Beirne = BPB; R. E. Blackith = REB; R. M. Blackith = RMB; P. J. Chandler = PJC; J. H. Cole = JHC; M. Dierks = MD; J. Dixon = JD; P. H. Grimshaw = PHG; J. N. Halbert = JNH; A. H. Haliday = AHH; E. G. Hancock = EGH; B. Healy = BH; A. G. Irwin = AGI; R. A. Lass = RAL; R. Moles = RM; R. Nash = RN; J. P. O'Connor = JPOC; J. P. O'Connor and M. A. O'Connor = JMOC; P. Oosterbroek = PO; O. W. Richards = OWR; R. F. Scharff = RFS; K. C. Side = KCS; M. C. D. Speight = MCDS; A. E. Stubbs = AES; AWS = A. W. Stelfox; R. I. Vane-Wright = RIVW; G. Verberne = GV.

= species in the British Isles only known from Ireland

● = species new to Ireland

A checklist of species of the Subfamily Limoniinae recorded from Ireland

- *Achyrolimonia decemmaculata* (Loew, 1873)
Antocha vitripennis (Meigen, 1830)
Dicranomyia (*Dicranomyia*) *affinis* (Schummel, 1829)
- *Dicranomyia* (*Dicranomyia*) *aperta* Wahlgren, 1904
Dicranomyia (*Dicranomyia*) *autumnalis* (Staeger, 1840)
Dicranomyia (*Dicranomyia*) *chorea* (Meigen, 1818)
Dicranomyia (*Dicranomyia*) *didyma* Meigen, 1804

- Dicranomyia* (*Dicranomyia*) *goritiensis* (Mik, 1864)
Dicranomyia (*Dicranomyia*) *lucida* (de Meijere, 1918)
Dicranomyia (*Dicranomyia*) *lutea* (Meigen, 1818)
Dicranomyia (*Dicranomyia*) *mitis* (Meigen, 1830)
Dicranomyia (*Dicranomyia*) *mitis* (species complex)
Dicranomyia (*Dicranomyia*) *modesta* (Meigen, 1818)
Dicranomyia (*Dicranomyia*) *omissinervis* (de Meijere, 1918)
Dicranomyia (*Dicranomyia*) *sera* (Walker, 1848)
● *Dicranomyia* (*Glochina*) *sericata* (Meigen, 1830)
Dicranomyia (*Idiopyga*) *danica* (Kuntze, 1919)
Dicranomyia (*Melanolimonia*) *caledonica* (Edwards, 1926)
Dicranomyia (*Melanolimonia*) *morio* (Fabricius, 1787)
Dicranomyia (*Melanolimonia*) *stylifera* (Lackschewitz, 1928)
Dicranomyia (*Numantia*) *fusca* (Meigen, 1804)
Dicranomyia (*Sivalimnobia*) *aquosa* (Verrall, 1886)
Geranomyia *bezzii* Alexander and Leonard, 1912
Geranomyia *unicolor* (Haliday, 1833)
Helius *flavus* (Walker, 1856)
Helius *longirostris* (Meigen, 1818)
Helius *pallirostris* Edwards, 1921
Limonia *flavipes* (Fabricius, 1787)
Limonia *macrostigma* (Schummel, 1829)
Limonia *nubeculosa* Meigen, 1804
Limonia *phragmitidis* (Schränk, 1781)
Limonia *trivittata* (Schummel, 1829)
Lipsothrix *remota* (Walker, 1848)
Metalimnobia (*Metalimnobia*) *bifasciata* (Schränk, 1781)
Metalimnobia (*Metalimnobia*) *quadrinotata* (Meigen, 1818)
Neolimonia *dumetorum* Meigen, 1804
Orimarga *attenuata* (Walker, 1849)

Bull. Ir. biogeog. Soc. No. 22

Orimarga juvenilis (Zetterstedt, 1851)

Rhipidia ctenophora (Loew, 1871)

Rhipidia maculata Meigen, 1818

Thaumastoptera calceata Mik, 1866

Subfamily Limoniinae

Achyrolimonia decemmaculata (Loew, 1873)

These are the first records of this species in Ireland.

KERRY: 10.v.1989, Mucross, Killarney V9686 (MT.3), MCDS; **WESTMEATH:** 28.viii.1990, Belvedere House N4247 (PV.2), JMOC.

Antocha vitripennis (Meigen, 1830)

Recorded by Mendl (1987) from Counties Cork, Galway and Kerry.

CLARE: 18.v.1970, Lough Derg (NU.1), PJC; **CORK:** 19-20.vi.1970, Glengarriff State Forest V9157 (MT.4), RIVW; **KERRY:** vii.1943, Killarney (MT.3), BPB (Beirne, 1951); 29.vi.1969, Rossacroonalloo Wood W0478 (MT.3), PJC; 18.vii.1975, Releagh Bridge, south of Kenmare V923603 (MT.4), AES; 18.vii.1975, Sheen V955675 (MT.4), AES; 19.vii.1975, Headley Bridge, Abbeyfeale R074194 (MT.3), AES; **KILKENNY:** 16.vi.1991, Inistioge S6337 (PU.2), JPOC; **WATERFORD:** 15.vii.1975, 4 miles east of Tikineor S304225 (NU.4), AES; **WEXFORD:** 3.vi.1974, Enniscorthy S9-4- (PU.4), KCS; **WICKLOW:** 25.vi.1975, Devil's Glen T2-9- (PU.3), PJC.

Dicranomyia (Dicranomyia) affinis (Schummel, 1829)

D. (D.) affinis is now considered to be a valid species but was previously included within the definition of *D. (D.) mitis*.

CORK: 29.v.1974, Dereenacarrin V8851 (MT.4), KCS (Ashe *et al.*, 1991); **DOWN:** 10.vi.1973, Cnocknafeola Pine Wood J2722 (PV.3), AGI (Ashe *et al.*, 1991); **MAYO:** vii.1910, Belclare (MV.3), JNH (Grimshaw, 1912 sub *Limonium autumnalis*).

Dicranomyia (Dicranomyia) aperta Wahlgren, 1904

This is the first record of this species in Ireland.

KILDARE: 30.viii.1991, Louisa Bridge N9936 (PV.4), JPOC.

Dicranomyia (Dicranomyia) autumnalis (Staeger, 1840)

Recorded by Mendl (1987) from Counties Cork, Galway, Kerry, Mayo, Sligo and Wicklow.
ARMAGH: 15.vii.1971, near Flagstaff J1020 (PA.4), PJC; **CLARE:** 20.vii.1975, Lough Atedaun, Corrofin R317897 (MU.3), AES; 23.vii.1975, Bridget Lake, Tulla R556810 (NU.1), AES; **CORK:** 28.vi.1969, Tobar Ghobnatan, near Ballyvourney (MT.3), PJC; 14.x.1973, Dunamark Falls (MT.4), PJC; 1.vii.1985, Garnish Island, Glengarriff V9366560 (MT.4), JMOC; **DERRY:** 22.v.1975, Ballyronan Pond, near Ballyronan H9587 (PA.3), AGI; **DOWN:** 13.iv.1975, Rostrevor, Hilltown Larch J2223 (PA.4), AGI; **GALWAY:** 22.ix.-3.x.1974, Roundstone (MV.2), PO; 24.ix.-2.x.1974, Recess (MV.4), PO; **KERRY:** 17.x.1973, Torc Cascade V9684 (MT.3), PJC; 17.vii.1975, Clonee Loughs, south-west of Kenmare V8264 (MT.4), AES; 17.vii.1975, Looscaunagh Lake, Derrygarraff V887704 (MT.4), AES; 9.ix.1982, Shevanea Q5005 (MT.1), EGH (Hancock, 1990, sub *Limonia*); 9.ix.1981, Galway's Bridge, Killarney V912804 (MT.3), JPOC; 9.ix.1981, Looscaunagh Lough V883794 (MT.3), JPOC; **LEITRIM:** 2.x.1977, Glencar G7-4- (NA.2), PJC; **MAYO:** 29.ix.1977, Westport Demesne L9-8- (MV.3), PJC; 30.ix.1977, Lough Conn, north of Pontoon G1-0- (MV.3), PJC; **ROSCOMMON:** 28.ix.1977, Castlerea M6-8- (NV.1), PJC; **SLIGO:** 13.v.1970, Lough Gill, Dooney Rock (NA.2), PJC; 1.x.1977, Templehouse G6-1- (NV.1), PJC; 1.x.1977, Ballinacarrow G6-1- (NV.1), PJC; **WEXFORD:** 28.viii.1980, Lady's Island Lake T104071 (PT.3), JPOC; 19.iv.1987, Heritage Park, Ferrycarrig T0122 (PT.3), JPOC; **WICKLOW:** vi.1940, Enniskerry (PU.3), BPB (Beirne, 1951); 16.ix.1968, Glenmalure, near waterfall (PU.3), PJC; 17.ix.1968 Glenmacnass, near waterfall (PU.3), PJC.

Dicranomyia (Dicranomyia) chorea (Meigen, 1818)

Mendl (1987) records the species from Counties Clare, Cork, Donegal, Galway, Kerry, Mayo, Meath, Sligo and Wicklow.
ANTRIM: 7.v.1970, Glenariff (PB.4), PJC; 28.iv.1971, Belfast (UF.2), RN; 8.v.1973, Dixon Park, Belfast J3067 (UF.2), AGI; 16.v.1975, Barnett's Park J3268 (UF.2), AGI; 18.v.1975, Ballygowan J4063 (UF.2), AGI; **CARLOW:** 24.vii.1975, Graiguealug S766715 (PU.1), AES; 21.iv.1987, Cloughristick S7069 (PU.2), JPOC; **CAVAN:** 15.v.1989, Virginia Woods N5987 (PV.1), JPOC; 15.ix.1991, Woodlawn, Lough Sheelin N471861 (PV.1), PA; **CLARE:** 18.v.1970, Cratloe Wood (NU.2), PJC; 22.v.1970, Burren, track to Oughtmama (MU.3), PJC;

Bull. Ir. biogeog. Soc. No. 22

17.vii.1981, River Caher, Burren M1509 (MU.3), JMOC; **CORK**: 30.v.1974, Bealad W3-4- (NT.2), KCS; 16.vii.1975, Kildorrery R723106 (NT.1), AES; 16.vii.1975, Mallow W550980 (NT.1), AES; 6.vii.1985, Glengarriff V907575 (MT.4), JMOC; **DOWN**: 1827-1831, Holywood (UF.1), AHH (Haliday, 1833); 27.iv.1974, Stormont J3974 (UF.1), AGI; 12-13.viii.1974, Light House Island, Copeland Islands J5985 (UF.1), AGI; 17.viii.1974, Stormont J3974 (UF.1), AGI; 2.ix.1974, Murlough, near Dundrum J1817 (PV.3), AGI; 16.v.1975, Stormont J3974 (UF.1), AGI; **DUBLIN**: ix.1891, Rathgar (PV.4), ?JNH; 7.viii.1981, Slade of Saggart O033245 (PV.4), JPOC; 13.x.1985, Malahide O2145 (PV.4), JMOC; 26.x.1987, Castleknock O089377 (PV.4), JMOC; 18.vi.1991, Naul O1461 (PV.4), JPOC; **KERRY**: 27.v.1974, Abbey Island, Derrynane V5-5- (MT.2), KCS; 17.vii.1975, Upper Lake area, Killarney V917820 (MT.3), AES; 17.vii.1975, Derreendarragh V795723 (MT.2), AES; 19.vii.1975, Headley Bridge, Abbeyfeale R074194 (MT.3), AES; **KILDARE**: 14.vi.1987, Donadee Forest Park N8332 (PV.2), JPOC; **KILKENNY**: 15.vii.1975, Three Bridges, Knockroe, Piltown S423226 (PU.2), AES; **LAOIS**: 11.vi.1983, The Derries N583051 (PU.1), JMOC; **LEITRIM**: 2.x.1977, Glencar G7-4- (NA.2), PJC; **LOUTH**: 29.vi.1975, Thomastown N9-9- (PV.3), PJC; **MAYO**: 25-27.ix.1974, Cong (MV.4), PO; 29.ix.1977, Westport Demesne L9-8- (MV.3), PJC; **SLIGO**: 13.v.1970, Lough Gill, Dooney Rock (NA.2), PJC; **TYRONE**: 8.v.1970, Gortin Glen H4-8- (PA.1), PJC; **WATERFORD**: 15.vii.1975, Carrickbeg S404216 (PT.1), AES; **WESTMEATH**: 6.v.1987, Ballynafid N4060 (PV.2), PA; 23.vii.1989, Pakenham N4470 (PV.2), JPOC; **WEXFORD**: 15.vii.1975, near Newbawn S856244 (PU.4), AES; 19.iv.1987, Ferrycarrig T0122 (PT.3), JPOC; 29.v.1987, Oaklands S7125 (PU.2), JPOC; 30.iii.1989, Ferrycarrig T0023 (PT.3), JPOC; **WICKLOW**: 24.vi.1975, Whaley Abbey T1-8- (PU.3), PJC; 25.vi.1975, Powerscourt Deer Park O1-1- (PU.3), PJC; 16.viii.1981, Russellstown Park N964109 (PU.3), JMOC; 16.iv.1982, Russborough N9611 (PU.3), JMOC; 26-27.iv.1986, Glen of the Downs O2611 (PU.3), JMOC; 5.vi.1989, Avondale T1985 (PU.3), JPOC.

Dicranomyia (Dicranomyia) didyma Meigen, 1804

Also recorded from Counties Donegal, Galway, Kerry, Waterford and Wicklow (Mendl, 1987). The species *Dicranomyia oscillans* Haliday, which was described from Ireland by Haliday (1833), is a junior synonym of *D. didyma* - the type is preserved in the National

Museum of Ireland.

CLARE: 26.v.1975, Caher River, Burren M1408 (MU.3), AGI; **DOWN:** 1827-1831, Holywood (UF.1), AHH (Haliday, 1833, sub *oscillans*); 1827-1831, Sliabh Donard (UF.2), AHH (Haliday, 1833, sub *oscillans*); 1827-1831, Tullymore [= Tollymore] Park J3531 (UF.2), AHH (Haliday, 1833, sub *oscillans*); 1827-1831, Mountains of Mourne (PA.4), AHH (Haliday, 1833, sub *oscillans*); **DUBLIN:** 7.viii.1981, Slade of Saggart O033245 (PV.4), JPOC; **KERRY:** no date, no locality [?Killarney] (MT.3) (Edwards, 1938); **TIPPERARY:** 16.vii.1975, Burncourt R937192 (NT.3), AES; **WICKLOW:** 25.vi.1975, Devil's Glen T2-9- (PU.3), PJC; 7.viii.1990, Devil's Glen T2399 (PU.3), JMOC.

Dicranomyia (Dicranomyia) goritiensis (Mik, 1864)

DOWN: 24.viii.1974, Deer Bay, Main Copeland Island J5983 (UF.1), AGI; **MAYO:** 11.vi.1909, Clare Island (MV.1), ?JNH/PHG (Grimshaw, 1912; Edwards, 1938); **WATERFORD:** 11.vi.1991, Dunmore East S6800 (PT.1), JPOC.

Dicranomyia (Dicranomyia) lucida (de Meijere, 1918)

CORK: 6.vii.1989, Rahan W6497 (NT.1), JPOC; **WATERFORD:** 4.vii.1989, Ballin Lough S4403 (PT.1), JMOC; **WEXFORD:** 14.vii.1975, Orristown T0413 (PT.3), AES (Ashe *et al.*, 1991).

Dicranomyia (Dicranomyia) lutea (Meigen, 1818)

D. (D.) lutea is now considered to be a valid species but was previously included within the definition of *D. (D.) mitis*. Although the species name *lutea* is recorded in the Irish literature since Haliday (1833), the only confirmed record to-date is that given in Hancock (1990).

KERRY: 14.ix.1982, Dreenagh Q715320 (MU.2), EGH (Hancock, 1990, sub *Limonia mitis* f. *lutea*).

Dicranomyia (Dicranomyia) mitis (Meigen, 1830)

The definition of *D. (D.) mitis* has been restricted but previously incorporated several closely related species including *affinis* and *lutea*. It has not yet been possible to assign some *mitis* records to the correct species and such records have been included in the next entry under "*mitis* (species complex)".

CORK: 19-20.vi.1970, Glengarriff State Forest V9157 (MT.4), RIVW; **DUBLIN:** 17.vii.1971, Howth Woods (PV.4), PJC; **KERRY:** 29.vi.1969, Glenflesk (MT.3), PJC; **TIPPERARY:**

16.vii.1975, Burncourt R937192 (NT.3), AES; **WICKLOW**: 25.vi.1975, Powerscourt Deer Park O1-1- (PU.3), PJC.

***Dicranomyia (Dicranomyia) mitis* (species complex)**

The broader definition of *D. (D.) mitis* has recently been restricted but it is now known to have previously incorporated several closely related species including *affinis*, *lutea* and *mitis* (*sensu stricto*). It has not yet been possible to assign the following *mitis* records, or those recorded by Mendl (1987) from sites in Counties Galway, Kerry, Mayo and Wicklow to the correct species, as all these specimens need to be re-identified.

DOWN: 1827-1831, Holywood (UF.1), AHH (Haliday, 1833, sub *lutea*); **MAYO**: vii.1910, Belclare (MV.3), JNH (Grimshaw, 1912); no date [1909-1910], Clare Island (MV.1), ?JNH/PHG (Grimshaw, 1912); no date [1909-1910], Westport (MV.3), PHG (Grimshaw, 1912 sub *lutea*); **OFFALY**: 8.ix.1988, All Saints Bog N0010 (NU.3), REB/RMB (Speight, 1990).

***Dicranomyia (Dicranomyia) modesta* (Meigen, 1818)**

Recorded by Mendl (1987) from Counties Clare, Cork, Donegal, Galway, Kerry, Meath and Sligo.

ANTRIM: 23.iv.1972, Belfast J307674 (UF.2), RN; 31.viii.1974, Ardmore Point, Lough Neagh J0979 (PA.3), AGI; **CARLOW**: 24.ix.1982, Cloughristick S7069 (PU.2), JMOC; **CAVAN**: 27.x.1990, Virginia Woods N5987 (PV.1), JMOC; 15.ix.1991, Woodlawn, Lough Sheelin N471861 (PV.1), PA; **CORK**: 28.vi.1969, Tobar Ghobnatan (MT.3), PJC; 19-20.vi.1970, Glengarriff State Forest V9157 (MT.4), RIVW; 29.v.1974, Dunmanus Bay V8-3- (MT.4), KCS; 31.v.1974, North Ring W4-4- (NT.2), KCS; 16.vii.1975, Mallow W550980 (NT.1), AES; **DOWN**: 1827-1831, Holywood (UF.1), AHH (Haliday, 1833); 18.viii.1974, Ballygowan J4163 (UF.2), AGI; 24.viii.1974, Deer Bay, Main Copeland Island J5983 (UF.1), AGI; **GALWAY**: 24.vii.1958, between Moycullen and Spiddle (MV.4), GV; 22.ix.1974, near Roundstone (MV.2), MD; 24.ix.-2.x.1974, Recess (MV.4), PO; 25-27.ix.1974, Maam Cross, 12km west of Cong (MV.4), MD; **KERRY**: 8.ix.1981, Kenmare Estate, Killarney V945905 (MT.3), JPOC; 16.ix.1981, Ross Castle V950885 (MT.3), JPOC; 8.ix.1982, Ardfert Q7821 (MT.1), EGH (Hancock, 1990 sub *Limonia*); 14.ix.1982, Dreenagh Q715320 (MU.2), EGH (Hancock, 1990 sub *Limonia*); 27.viii.1987, O'Sullivan's Cascade, Killarney V9188 (MT.3), JPOC; **KILDARE**: 12.ix.1982, Grand Canal N933263 (PV.4), JMOC; **KILKENNY**:

23.vi.1975, Jenkinstown Wood S4-6- (PU.2), PJC; **LAOIS**: 11.vi.1983, The Derries N583051 (PU.1), JMOC; **LOUTH**: 29.vi.1975, Thomastown N9-9- (PV.3), PJC; **MAYO**: 25-27.ix.1974, Cong (MV.4), PO; 25.ix.-2.x.1974, Ashford Castle, Cong (MV.4), MD; 29.ix.1977, Westport Demesne L9-8- (MV.3), PJC; 30.ix.1977, Lough Conn, north of Pontoon G1-0- (MV.3), PJC; 30.ix.1977, Drummin Wood G2-0- (MV.3), PJC; **MEATH**: 15.vi.1989, Mornington O1575 (PV.3), JPOC; **MONAGHAN**: 29.vi.1975, near Lough Fea H8-0- (PV.1), PJC; **OFFALY**: 8.ix.1988, All Saints Bog N0010 (NU.3), REB/RMB (Speight, 1990); **ROSCOMMON**: 28.ix.1977, Lough Key Forest Park G8-0- (NV.1), PJC; **SLIGO**: 1.x.1977, Glen of Knocknarea G6-3- (NA.2), PJC; **TIPPERARY**: 21.vi.1975, Cregg S4-2- (PU.2), PJC; 22.vi.1975, wildlife sanctuary, near Dundrum R9-4- (NU.4), PJC; 22.vi.1975, Bansha Wood R9-3- (NU.4), PJC; **WATERFORD**: 22.vi.1970, Cappoquin X092994 (NT.3), RIVW; 1.vi.1974, Cappoquin X0-9- (NT.3), KCS; **WEXFORD**: 25.vii.1970, Cahore T2244 (PU.4), RIVW; 26.viii.1980, Carnsore Point T121038 (PT.3), JPOC; 2.ix.1980, Wexford Town T0519 (PT.3), JPOC; 3.vi.1984, Curracloe T1020 (PU.4), JMOC; 29.v.1987, Oaklands S7125 (PU.2), JPOC; **WICKLOW**: 4.vi.1974, Newcastle S3-0-, KCS (PU.3); 16.viii.1981, 23.viii.1981, Russellstown Park N964109 (PU.3), JMOC/MAOC.

Dicranomyia (Dicranomyia) omissinervis (de Meijere, 1918)

CORK: 16.vii.1975, Mallow W550980 (NT.1), AES (Ashe *et al.*, 1991); **MEATH**: 25.vi.1992, Slane, River Boyne N9673 (PV.3), PA; **WATERFORD**: 15.vii.1975, Carrickbeg S404216 (PT.1), AES (Ashe *et al.*, 1991).

Dicranomyia (Dicranomyia) sera (Walker, 1848)

Also known from one site in the Bantry area, Co. Cork (Mendl, 1987).

DUBLIN: 27.v.1961, 12.ix.1961, North Bull Island, Dublin Bay (PV.4), BH (Healy, 1975a, b; Speight and Healy, 1975); **GALWAY**: 22.ix.-3.x.1974, Roundstone (MV.2), PO.

Dicranomyia (Glochina) sericata (Meigen, 1830)

These are the first records of this species in Ireland.

CLARE: 21.iv.1984, Ailladie M088029 (MU.3), JMOC; 23.v.1985, near Corker Pass M308107 (MU.3), JMOC.

Dicranomyia (Idiopyga) danica (Kuntze, 1919)

WEXFORD: 25.vii.1970, Cahore T2244 (PU.4), RIVW (Ashe *et al.*, 1991); **WICKLOW**:

Bull. Ir. biogeog. Soc. No. 22

iv.1988, Blackditch Wood O3103 (PU.3), REB (Ashe *et al.*, 1991; Blackith *et al.*, 1991);
iv.1988, Killougher T3199 (PU.3), REB (Ashe *et al.*, 1991; Blackith *et al.*, 1991).

Dicranomyia (Melanolimonia) caledonica (Edwards, 1926)

The only Irish record, given in Mendl (1987), is from the Kilgarvan area, Co. Kerry.

Dicranomyia (Melanolimonia) morio (Fabricius 1787)

DOWN: 1827-1831, Holywood (UF.1), AHH (Haliday, 1833, sub *Glorhina leucocephala*);
KERRY: 8.ix.1982, Ardferit Q7821 (MT.1), EGH (Hancock, 1990 sub *Limonia*); **KILDARE:**
10.vi.1989, Louisa Bridge N9986 (PV.4), JPOC; **LEITRIM:** 10.v.1970, Lough Rinn (NV.3),
PJC; 15.v.1970, Glencar, near waterfall (NA.2), PJC; **MAYO:** 25-27.ix.1974, Cong (MV.4),
PO; **MEATH:** 19.v.1991, Kilmessan N8857 (PV.4), JMOC; 25.vi.1992, Corstown Loughs
N8991 (PV.3), PA; **SLIGO:** 13.v.1970, Glen of Knocknarea (NA.2), PJC; **WATERFORD:**
11.vi.1991, Portlaw Woods S4415 (PT.1), JMOC; **WEXFORD:** 26.viii.1980, Carnsore Point
T121038 (PT.3); 30.iii.1989, Ferrycarrig T0023 (PT.3), JPOC; **WICKLOW:** 17.ix.1968, near
Blessington (PU.3), PJC.

Dicranomyia (Melanolimonia) stylifera (Lackschewitz, 1928)

Mendl (1987) recorded it from the Beara Peninsula, Co. Kerry.

CLARE: 28.viii.1959, Fermoyle [= Formoyle] (MU.3), OWR (Richards, 1961); **MAYO:**
vii.1910, Clare Island (MV.1), PHG (Grimshaw, 1912, sub *morio*).

Dicranomyia (Numantia) fusca (Meigen, 1804)

Recorded from two sites by Mendl (1987), one in Co. Galway and one in Co. Wicklow.

ANTRIM: 2.x.1977, Barnett's Park, Belfast J3-7- (UF.2), PJC; **WICKLOW:** 25.vi.1975,
Powerscourt Deer Park O1-1- (PU.3), PJC; 25.vi.1975, Devil's Glen T2-9- (PU.3), PJC.

Dicranomyia (Sivalimnobia) aquosa (Verrall, 1886)

Recorded from two sites in the Killarney area, Co. Kerry (Mendl, 1987).

KERRY: 30.vi.1969, Torc Cascade (MT.3), PJC; **WICKLOW:** 25.vi.1975, Devil's Glen T2-
9- (PU.3), PJC.

Geranomyia bezzii Alexander and Leonard, 1912

WEXFORD: 5.vii.1991, Fethard S7905 (PT.1), JPOC (Ashe and O'Connor, 1993).

Geranomyia unicolor (Haliday, 1833)

Also known from one site in Co. Cork (Mendl, 1987).

Bull. Ir. biogeog. Soc. No. 22

DONEGAL: no date, no locality (Edwards, 1938); **DOWN:** vii.1832, Donaghadee (UF.1), AHH (Haliday, 1833); 24.viii.1974, Deer Bay, Main Copeland Island J5983 (UF.1), AGI; **DUBLIN:** no date, Malahide (PV.4), JNH (Carpenter, 1908); **KERRY:** vii.1854, Smerwick Bay, past Fort del' Or (MT.1), AHH (Hogan and Haliday, 1855); 31.v.1992, Lamb's Head, Caherdaniel V5256 (MT.2), PA.

Helius flavus (Walker, 1856)

CARLOW: 18.vi.1991, Bahana Woods S7239 (PU.2), JPOC; **KILKENNY:** 23.vi.1975, Jenkinstown Wood S4-6- (PU.2), PJC (Ashe *et al.*, 1991); **WESTMEATH:** 28.vi.1987, Scragh Bog N4259 (PV.2), PJC (Ashe *et al.*, 1991); 22.vi.1989, Ballynafid Lough N4060 (PV.2), JPOC.

Helius longirostris (Meigen, 1818)

ANTRIM: 13.vi.1975, Masserene J1485 (PA.3), AGI; **CORK:** 19-20.vi.1970, Glengarriff State Forest V9157 (MT.4), RIVW; **DOWN:** 1827-1831, Holywood (UF.1), AHH (Haliday, 1833, sub *Rhamphidia*); **LOUTH:** 29.vi.1975, Ballymascanlon Swamp J0-1- (PV.3), PJC; **MONAGHAN:** 9.vi.1977, Carrickmacross (PV.1), JHC; **WEXFORD:** 25.vii.1970, Cahore T2244 (PU.4), RIVW; **WICKLOW:** vii.1856, Murrough, Broad Lough (PU.3), AHH (Haliday, 1857 sub *Rhamphina*; Carpenter, 1908).

Helius pallirostris Edwards, 1921

WATERFORD: 1.vi.1991, Belle Lake S6605 (PT.1), JPOC; 19.vi.1991, Ballin Lough S4403 (PT.1), JPOC; **WEXFORD:** 25.vii.1970, Cahore T2244 (PU.4), RIVW (Ashe *et al.*, 1991).

Limonia flavipes (Fabricius, 1787)

There is one record from Lough Gill, Co. Sligo (Mendl, 1987).

KERRY: 19.vii.1975, Barry's Glen, north of Killarney V954976 (MT.3), AES.

Limonia macrostigma (Schummel, 1829)

ANTRIM: 19.v.1973, Masserene, Lough Neagh J1485 (PA.3), AGI; 2.x.1977, Barnett's Park, Belfast J3-7- (UF.2), PJC; **CARLOW:** 18.vi.1991, Bahana Woods S7239 (PU.2), JPOC; **CAVAN:** 15.ix.1991, Woodlawn, Lough Sheelin N471861 (PV.1), PA; **CORK:** 19-20.vi.1970, Glengarriff State Forest V9157 (MT.4), RIVW; 6.vii.1989, Rahan W6497 (NT.1), JPOC; **DOWN:** 1827-1831, Holywood (UF.1), AHH (Haliday, 1833 sub *Dicranomyia musta* [= *inusta*]); 18.v.1975, Ballygowan Wood J4163 (UF.2), AGI; **KERRY:** 17.x.1973, Ross

Island woods (MT.3), PJC; 16.ix.1981, Ross Castle V950885 (MT.3), JPOC; **MAYO**: 25-27.ix.1974, Cong (MV.4), PO; **WATERFORD**: 1.vi.1991, Belle Lake S6605 (PT.1), JPOC; 19.vi.1991, Ballin Lough S4403 (PT.1), JPOC; **WEXFORD**: 2.vi.1986, Ferrycarrig T005228 (PT.3), JPOC; 4.vi.1987, Killoughrim Forest Park S8941 (PU.4), JPOC; **WICKLOW**: 25.vi.1975, Powerscourt Deer Park O1-1- (PU.3), PJC; 15.v.1991, Knocksink O2117 (PU.3), JPOC.

***Limonia nubeculosa* Meigen, 1804**

Recorded by Mendl (1987) from Counties Clare, Cork, Donegal, Galway, Kerry, Mayo, Sligo and Wicklow.

ANTRIM: 28.v.1973, Belfast J3067 (UF.2), RN; 29.x.1974, Masserene J1485 (PA.3), AGI; 16.v.1975, Dixon Park J3067 (UF.2), AGI; 24.v.1975, Portglenone Forest C9802 (PA.3), AGI; 24.v.1975, Garron Wood D2922 (UG.2), AGI; 2.x.1977, Barnett's Park, Belfast J3-7- (UF.2), PJC; **CAVAN**: 22.ix.1985, Virginia Woods N5987 (PV.1), JMOC; 15.ix.1991, Woodlawn, Lough Sheelin N471861 (PV.1), PA; **CLARE**: 25.vii.1966, Poll-an-Ionian, Ballynalacken R0999 (MU.3), RAL (Hazelton, 1974a, b, c); 21.vii.1975, Lisdoonvarna R137980 (MU.3), AES; 23.vii.1975, Bridget Lake, Tulla R556810 (NU.1), AES; 30.v.1984, near Ennis R292796 (MU.3), JPOC; **CORK**: 19-20.vi.1970, Glengarriff State Forest V9157 (MT.4), RIVW; 16.vii.1975, Ballymaquirk Bridge, Banteer W385987 (NT.1), AES; **DOWN**: 1827-1831, Holywood (UF.1), AHH (Haliday, 1833); 16.v.1966, Bangor (UF.1), AGI; 10.vi.1969, Stormont (UF.1), AGI; 16.v.1971, Bangor J3-7- (UF.1), RN[?]; 10.vi.1971, Stormont J3-7- (UF.1), RN[?]; 12-13.viii.1974, Light House Island, Copeland Islands J5985 (UF.1), AGI; 17.viii.1974, Stormont J3974 (UF.1), AGI; 2.ix.1974, Murlough, near Dundrum J4134 (UF.2), AGI; 18.v.1975, Ballygowan Wood J4163 (UF.2), AGI; **DUBLIN**: 1.xi.1981, Slade of Saggart O033245 (PV.4), JMOC; 12.v.1991, St Catherine's Wood O0136 (PV.4), JMOC; 18.vi.1991, Naul O1461 (PV.4), JPOC; **GALWAY**: 26.vii.1958, Toomdeolabridge, Connemara (MV.2), GV; 23.v.1974, Maam L9-5- (MV.4), KCS; 22.ix.1974, near Roundstone (MV.2), MD; 22.ix.-3.x.1974, Roundstone (MV.2), PO; 2.x.1974, Twelve Pins (MV.2), MD; **KERRY**: 16.vii.1975, 1 mile east of Barraduff W102911 (MT.3), AES; 17.vii.1975, Upper Lake area, Killarney V917820 (MT.3), AES; 17.vii.1975, south of Killarney V932826 (MT.3), AES; 18.vii.1975, Sheen V955675 (MT.4), AES; 19.vii.1975, Barry's Glen, north of Killarney

V954976 (MT.3), AES; 8.ix.1981, Kenmare Estate, Killarney V945905 (MT.3), JPOC; 14.ix.1982, Dreenagh Q715320 (MU.2), EGH (Hancock, 1990); **KILDARE**: 12.ix.1982, Grand Canal N933263 (PV.4), JMOC; 11.x.1985, 14.vi.1987, Donadea Forest Park N8332 (PV.2), JPOC; 6.vi.1991, Donadea Forest Park N8332 (PV.2), PA; **KILKENNY**: 15.vii.1975, Davidstown S646186 (PT.1), AES; 23.vi.1975, Jenkinstown Wood S4-6- (PU.2), PJC; **LAOIS**: 20.ix.1982, The Derries N586050 (PU.1), JPOC; 3.x.1982, Emo N538052 (PU.1), JMOC; 11.vi.1983, The Derries N583051 (PU.1), JPOC; **LEITRIM**: 2.x.1977, Glencar G7-4- (NA.2), PJC; **LIMERICK**: 19.vii.1975, Adare Bridge R472466 (NU.2), AES; **LOUTH**: 29.vi.1975, Thomastown N9-9- (PV.3), PJC; **MAYO**: 29.ix.1977, Westport Demesne L9-8- (MV.3), PJC; 30.ix.1977, Lough Conn, north of Pontoon G1-0- (MV.3), PJC; 30.ix.1977, Drummin Wood G2-0- (MV.3), PJC; 25-27.ix.1974, Cong M1555 (MV.4), PO; 25.ix.- 2.x.1974, Ashford Castle, Cong M1555 (MV.4), MD; **OFFALY**: 8.ix.1988, All Saints Bog N0010 (NU.3), REB/RMB (Speight, 1990); **ROSCOMMON**: 28.ix.1977, Castlerea M6-8- (NV.1), PJC; **SLIGO**: 1.x.1977, Templehouse G6-1- (NV.1), PJC; 1.x.1977, Collooney G6-2- (NA.2), PJC; 1.x.1977, Glen of Karocknarea [= Knocknarea] G6-3- (NA.2), PJC; 1.x.1977, Ballinacarrow G6-1- (NV.1), PJC; **TIPPERARY**: 6.vii.1969, Mitchelstown Old Cave R925163 (NT.3), JD (Hazelton, 1974a, b, c); 21.vi.1975, Cregg S4-2- (PU.2), PJC; 22.vi.1975, Woodrooff S1-2- (NU.4), PJC; 22.vi.1975, wildlife sanctuary, near Dundrum R9-4- (NU.4), PJC; 22.vi.1975, Bansha Wood R9-3- (NU.4), PJC; 27.v.1984, near Ballina R710725 (NU.1), JPOC; 20.v.1985, near Ballina R710725 (NU.1), JMOC; **TYRONE**: 22.v.1975, Washing Moor, Derryloughlan H8864 (PA.4), AGI; 2.x.1977, Dunmany Forest H5-5- (PA.2), PJC; **WATERFORD**: 15.vii.1975, 4 miles east of Tikineor S304225 (NU.4), AES; **WEXFORD**: 15.vii.1975, near Newbawn S856244 (PU.4), AES; 3.ix.1980, 5.ix.1980, Stoneyford T105098 (PT.3), JMOC; 14.vi.1982, Ballyhighland S8840 (PU.4), JMOC; 25.v.1987, Lady's Island Lake T104071 (PT.3), JPOC; 27.v.1987, Killoughrim Forest Park S8941 (PU.4), JPOC; 28.iii.1989, Tintern S7810 (PT.1), JPOC; 8.vi.1991, Coolbawn House S8337 (PU.4), JMOC; **WICKLOW**: 24.vi.1975, Glendalough T1-9- (PU.3), PJC; 24.vi.1975, Derrybawn Woods T1-9- (PU.3), PJC; 25.vi.1975, Powerscourt Deer Park O1-1- (PU.3), PJC; 26.vi.1975, Bellevue Woods, Glen of the Downs O2-1- (PU.3), PJC; 8.xi.1981, Glendalough T112964 (PU.3), JPOC; 27.viii.1981, Glen of the Downs O263110 (PU.3), JPOC; 3.x.1986, Glen of the Downs

Bull. Ir. biogeog. Soc. No. 22

O260115 (PU.3), JMOC; 27.ix.1987, Glen of the Downs O2611 (PU.3), JPOC; 27.v.1988, 5.vi.1989, Avondale T1985 (PU.3), JPOC; 15.vi.1988, Powerscourt O2012 (PU.3), JPOC; 15.v.1991, Knocksink O2117 (PU.3), JPOC.

Limonia phragmitidis (Schränk, 1781)

Previously recorded as *Limonia tripunctata* (Fabricius, 1782). Mendl (1987) records it from Counties Clare, Kerry and Sligo.

CORK: 3.vii.1985, Bantry House V985481 (MT.4), JPOC; **CLARE:** 29.v.1984, Ballyeigher R346940 (NU.1), JMOC; **DONEGAL:** vii.1894, Templenew G9159 (NA.4), ?collector; **DOWN:** 1827-1831, Holywood (UF.1), AHH (Haliday, 1833); 5.vi.1969, Stormont (UF.1), AGI; 10.vi.1971, Stormont J3-7- (UF.1), RN[?]; **KILDARE:** 14.vi.1987, Donadea Forest Park N8332 (PV.2), JPOC; **LOUTH:** 15.vi.1989, Townley Hall O0376 (PV.3), JPOC; **MAYO:** vi.1909, Westport, in Demesne (MV.3), ?JNH (Grimshaw, 1912); **MONAGHAN:** 20.v.1976, Carrickmacross H8-0- (PV.1), JHC; 21.v.1976, Lough Egish H7813 (PV.1), JHC; **TIPPERARY:** 22.vi.1975, wildlife sanctuary, near Dundrum R9-4- (NU.4), PJC; 27.v.1984, near Ballina R710725 (NU.1), JPOC; **WATERFORD:** 1.vi.1991, Belle Lake S6605 (PT.1), JPOC; 12.vi.1991, 2km north-west of Passage East S684115 (PT.1), JPOC; **WEXFORD:** 25.vii.1970, Cahore T2244 (PU.4), RIVW; 18.vi.1982, Oaklands S718259 (PU.2), JMOC; 26.v.1987, Ballyteige S9504 (PT.3), JPOC; 10.vi.1991, Curracloe T1127 (PU.4), JPOC; **WICKLOW:** 28.v.1989, Knocksink O2117 (PU.3), JPOC.

Limonia trivittata (Schummel, 1829)

Recorded by Mendl (1987) from one site in Killarney, Co. Kerry.

CORK: 16.vii.1975, Kildorrery R723106 (NT.1), AES; 16.vii.1975, Ballymaquirk Bridge, Banteer W385987 (NT.1), AES; **DOWN:** 12-13.viii.1974, Light House Island, Copeland Islands J5985 (UF.1), AGI; **KERRY:** 30.vi.1969, Ross Bay Woods, Killarney (MT.3), PJC; 16.vii.1975, 1 mile east of Barraduff W102911 (MT.3), AES; **KILKENNY:** 15.vii.1975, Davidstown S646186 (PT.1), AES; **WATERFORD:** 15.vii.1975, Carrickbeg S404216 (PT.1), AES; 5.vii.1990, Belle Lake S6605 (PT.1), JPOC; **WICKLOW:** 25.vi.1975, Glen of the Downs (PU.3), PJC; **WEXFORD:** 6.vii.1990, Tintern Abbey S7810 (PT.1), JPOC.

Lipsothrix remota (Walker, 1848)

CLARE: 22.v.1970, Lisdoonvarna R1397 (MU.3), PJC (Ashe *et al.*, 1991); **FERMANAGH:**

17.vi.1966, Boho Cave H127445 (NA.4), RAL (Hazelton, 1974a, b, c); **OFFALY**: 26.vi.1987, wooded bank of Camcor River N2204 (NU.3), PJC (Ashe *et al.*, 1991); **WICKLOW**: 15.v.1991, Knocksink Wood O2118 (PU.3), PA (Ashe *et al.*, 1991).

Metalimnobia (Metalimnobia) bifasciata (Schränk, 1781)

CORK: 7.vii.1985, Glengarriff V920565 (MT.4), JMOC; **DOWN**: 1827-1831, Holywood (UF.1), AHH (Haliday, 1833, sub *Limnobia xanthoptera*); 20.viii.1972, Murlough National Nature Reserve, Dundrum J4135 (UF.2), AGI (Nash, 1989, sub *Limonia*); **GALWAY**: 2.x.1974, Twelve Pins (MV.2), MD; **LAOIS**: 20.ix.1982, The Derries N586050 (PU.1), JPOC; **MAYO**: 12.vi.1909, Glendarie [= Glendarary], Achill Island (MV.1), ?JNH (Grimshaw, 1912); 25-27.ix.1974, Cong M1555 (MV.4), PO; **WICKLOW**: 17.ix.1893, Enniskerry (PU.3), JNH; 25.viii.1938, Athdown (PU.3), AWS; 18.ix.1968, Glen of the Downs (PU.3), PJC; 16.viii.1981, Russellstown Park N964109 (PU.3), JMOC; 14.ix.1984, Coolattin Wood T018692 (PU.4), JPOC.

Metalimnobia (Metalimnobia) quadrinotata (Meigen, 1818)

ANTRIM: 12.viii.1973, Belfast J3269 (UF.2), RN; **DOWN**: 1827-1831, Holywood (UF.1), AHH (Haliday, 1833, sub *Limnobia*); 1827-1831, Tullymore [= Tollymore] Park J3531 (UF.2), AHH (Haliday, 1833, sub *Limnobia*); 1827-1831, Mountains of Mourne (PA.4), AHH (Haliday, 1833, sub *Limnobia*); **GALWAY**: vi.1895, Clonbrock (NV.2), JNH; **MAYO**: 5.viii.1911, Belclare (MV.3), PHG (Grimshaw, 1912); no date [1909-1910], Brackloon Wood, Westport (MV.3), PHG (Grimshaw, 1912); 25-27.ix.1974, Cong M1555 (MV.4), PO; **SLIGO**: vii.1902, Ballysadare area, Lough Gill (NA.2), ?JNH; **WATERFORD**: no date, Cappoquin (NT.3) (Edwards, 1938).

Neolimonia dumetorum Meigen, 1804

Also recorded from Counties Galway, Kerry, Mayo and Wicklow (Mendl, 1987).

CAVAN: 28.vi.1975, near Lough Ramor N5-8- (PV.1), PJC; **CORK**: 19-20.vi.1970, Glengarriff State Forest V9157 (MT.4), RIVW; 16.vii.1975, Ballymaquirk Bridge, Banteer W385987 (NT.1), AES; **DOWN**: 1827-1831, Holywood (UF.1), AHH (Haliday, 1833, sub *Glorhina dumetorum*); **DUBLIN**: 7.viii.1981, Slade of Saggart O033245 (PV.4), JPOC; **KERRY**: 17.vii.1975, Upper Lake area, Killarney V917820 (MT.3), AES; 17.vii.1975, Clonee Loughs, south-west of Kenmare V8264 (MT.4), AES; 17.vii.1975, Reen V870705 (MT.4),

Bull. Ir. biogeog. Soc. No. 22

AES; 18.vii.1975, Sheen V955675 (MT.4), AES; 13.ix.1982, Loch Slat Q601080 (MT.1), EGH (Hancock, 1990 sub *Limonia*); **KILDARE**: 23.vi.1975, Ardsclull Mote S7-9- (PU.1), PJC; 6.vi.1991, Donadea Forest Park N8332 (PV.2), PA; **KILKENNY**: 23.vi.1975, Jenkinstown Wood S4-6- (PU.2), PJC; **LIMERICK**: 19.vii.1975, Adare Bridge R472466 (NU.2); AES; **MAYO**: 25-27.ix.1974, Cong M1555 (MV.4), PO; **WATERFORD**: 15.vii.1975, 4 miles east of Tikineor S304225 (NU.4), AES; 1.vi.1991, Belle Lake S6605 (PT.1), JPOC; **WEXFORD**: 10.vi.1986, Oaklands S715255 (PU.2), JPOC; **WICKLOW**: 24.vi.1975, Glendalough T1-9- (PU.3), PJC; 24.vi.1975, Derrybawn Woods T1-9- (PU.3), PJC; 26.vi.1975, Bellevue Woods, Glen of the Downs O2-1- (PU.3), PJC; 15.vi.1988, Powerscourt O2012 (PU.3), JPOC.

Orimarga attenuata (Walker, 1849)

The only record of the species in Ireland is from Turner's Rock, Beara Peninsula, Co. Cork (Mendl, 1987). It is a species which has yet to be found in Britain.

Orimarga juvenilis (Zetterstedt, 1851)

Only known from a single site in the Killarney region, Co. Kerry (Mendl, 1987).

Rhiphidia ctenophora (Loew, 1871)

DUBLIN: 27.vi.1975, Howth Woods, Dublin O2-3- (PV.4), PJC (Ashe *et al.*, 1991); **WICKLOW**: 14.v.1992, Glendalough T112956 (PU.3), PA (reared from a rot-hole in a living *Quercus*, adults hatched 1.vi.1992 and 9.vi.1992).

Rhiphidia maculata Meigen, 1818

Mendl (1987) records it from Counties Clare, Cork, Donegal, Galway, Kerry, Mayo, Sligo and Wicklow. Previously recorded as *Rhiphidia duplicata* auct. not Doane, 1900.

ANTRIM: 18.vi.1972, Belfast J322692 (UF.2), RN; 5.ix.1974, Ardmore Point, Lough Neagh J0979 (PA.3), AGI; 16.v.1975, Barnett's Park J3268 (UF.2), AGI; **CAVAN**: 28.vi.1975, near Lough Ramor N5-8- (PV.1), PJC; 15.ix.1991, Woodlawn, Lough Sheelin N471861 (PV.1), PA; **CLARE**: 19.v.1970, near Moy House, Lahinch (MU.3), PJC; 19.v.1970, Ballynalacken Castle (MU.3), PJC; 30.v.1984, near Ennis R292796 (MU.3), JPOC; **CORK**: 19-20.vi.1970, Glengarriff State Forest V9157 (MT.4), RIVW; **DOWN**: 1827-1831, Holywood (UF.1), AHH (Haliday, 1833); 12-13.viii.1974, Light House Island, Copeland Islands J5985 (UF.1), AGI; 18.viii.1974, Ballygowan J4163 (UF.2), AGI; **DUBLIN**: 27.vi.1975, Howth Woods, Dublin

O2-3- (PV.4), PJC; **GALWAY**: 22.ix.-3.x.1974, Roundstone (MV.2), PO; **KERRY**: 29.vi.1969, Rossacroonahoo Wood (MT.3), PJC; 19.vii.1975, Headley Bridge, Abbeyfeale R074194 (MT.3), AES; 9.ix.1982, Glanafahan V336970 (MT.1), EGH (Hancock, 1990 sub *Limonia*); 13.ix.1982, Loch Slat Q601080 (MT.1), EGH (Hancock, 1990 sub *Limonia*); **KILDARE**: 23.vi.1975, Ardscull Mote S7-9- (PU.1), PJC; **LEITRIM**: 2.x.1977, Glencar G7-4- (NA.2), PJC; **LOUTH**: 29.vi.1975, Killin Park J0-0- (PV.3), PJC; **MAYO**: 25.ix.-2.x.1974, Lough Mask (MV.4), MD; 29.ix.1977, Westport Demesne L9-8- (MV.3), PJC; 30.ix.1977, Lough Conn, north of Pontoon G1-0- (MV.3), PJC; **MONAGHAN**: 15.vii.1971, Lough Muckno (PV.1), PJC; **OFFALY**: 8.ix.1988, All Saints Bog N0010 (NU.3), REB/RMB (Speight, 1990); **ROSCOMMON**: 28.ix.1977, Castlerea M6-8- (NV.1), PJC; 28.ix.1977, Lough Key Forest Park G8-0- (NV.1), PJC; **SLIGO**: 13.v.1970, Glen of Knocknarea (NA.2), PJC; 1.x.1977, Glen of Knocknarea G6-3- (NA.2), PJC; 1.x.1977, Ballinacarrow G6-1- (NV.1), PJC; **TIPPERARY**: 22.vi.1975, Woodrooff S1-2- (NU.4), PJC; **WATERFORD**: 22.vi.1970, Cappoquin X092994 (NT.3), RIVW; 21.vi.1975, Mountneill S1-1- (NT.3), PJC; **WICKLOW**: 16.viii.1981, Russellstown Park N964109 (PU.3), JMOC.

Thaumastoptera calceata Mik, 1866

CARLOW: 17.vi.1991, St Mullins S7238 (PU.2), JPOC; **KERRY**: 17.vii.1975, Reen V870705 (MT.4), AES; **KILDARE**: 16.v.1984, Louisa Bridge N991369 (PV.4), JMOC (reared from larvae collected on 17.iii.1984) (O'Connor *et al.*, 1986); **LOUTH**: 18.vi.1982, Rampart, near Greenore J2109 (PV.3), PA; **WATERFORD**: 15.vii.1975, Carrickbeg S404216 (PT.1), AES; 1.vi.1991 Belle Lake S6605 (PT.1), JPOC; **WEXFORD**: 19.vi.1990, J. F. Kennedy Park S7319 (PT.1), JMOC; **WICKLOW**: 20.vi.1991, Kilmacanogue Marsh O2513 (PU.3), PA.

Discussion

There is only one Irish county, Longford, out of a total of 32 counties for which there are no Limoniinae records. The most common and widespread species is *Limonia nubeculosa*. From the available records, several others including *Dicranomyia* (*D.*) *autumnalis*, *D.* (*D.*) *chorea*, *D.* (*D.*) *modesta*, *Neolimonia dumetorum* and *Rhipidia maculata* are also very common and widespread.

There are three genera, *Atypophthalmus*, *Dicranoptycha* and *Discobola*, and 31 additional species of Limoniinae recorded in Britain which have not been found in Ireland but the majority of these should occur here. Based on Falk's (1991) assessment of the scarce and threatened flies in Britain there are 15 species of Irish Limoniinae, or 38% of those known fauna, which fit into one of the four main Red Data Book [= RDB] categories which in order of importance are "RDB1 - endangered", "RDB2 - vulnerable", "RDB3 - rare" and "notable". The single Irish species not found in Britain, *Orimarga attenuata*, is not ranked in Falk (1991) but we have assigned it to the "vulnerable" category. The following is a list of these 15 species and their ranking based on Falk (1991).

<i>Dicranomyia (Dicranomyia) aperta</i>	RDB1 - Endangered
<i>Dicranomyia (Dicranomyia) omissinervis</i>	RDB2 - Vulnerable
<i>Dicranomyia (Melanolimonia) stylifera</i>	RDB2 - Vulnerable
<i>Geranomyia bezzii</i>	RDB2 - Vulnerable
<i>Orimarga attenuata</i>	RDB2 - Vulnerable
<i>Rhiphidia ctenophora</i>	RDB2 - Vulnerable
<i>Dicranomyia (Dicranomyia) goritiensis</i>	RDB3 - Rare
<i>Dicranomyia (Idiopyga) danica</i>	RDB3 - Rare
<i>Dicranomyia (Dicranomyia) lucida</i>	Notable
<i>Dicranomyia (Melanolimonia) caledonica</i>	Notable
<i>Dicranomyia (Sivalimnobia) aquosa</i>	Notable
<i>Helius pallirostris</i>	Notable
<i>Limonia trivittata</i>	Notable
<i>Orimarga juvenilis</i>	Notable
<i>Thaumastoptera calceata</i>	Notable

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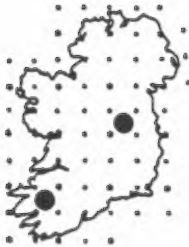
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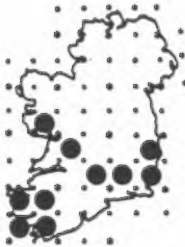
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FIGURE 1: distribution maps, based on the UTM 50km grid, for Limoniinae crane-fly species occurring in Ireland, as well as a coverage map for all records.



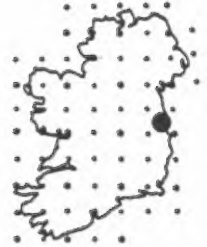
*Achyrolimonia
decemmaculata*



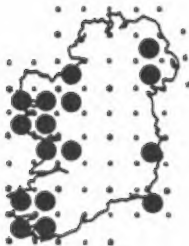
*Antocha
vitripennis*



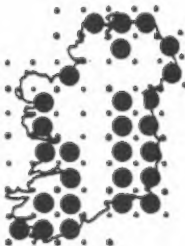
*Dicranomyia
(Dicranomyia)
affinis*



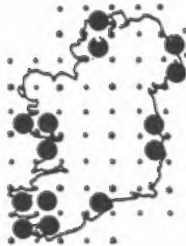
*Dicranomyia
(Dicranomyia)
aperta*



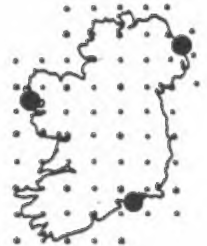
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(Dicranomyia)
autumnalis*



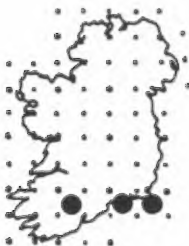
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(Dicranomyia)
chorea*



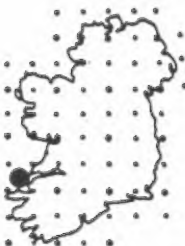
*Dicranomyia
(Dicranomyia)
didyma*



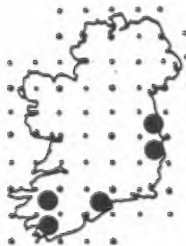
*Dicranomyia
(Dicranomyia)
goritiensis*



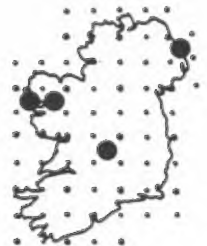
*Dicranomyia
(Dicranomyia)
lucida*



*Dicranomyia
(Dicranomyia)
lutea*

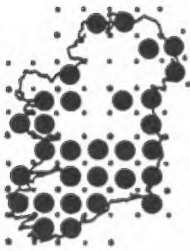


*Dicranomyia
(Dicranomyia)
mitis*

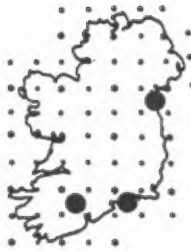


*Dicranomyia
(Dicranomyia)
mitis (complex)*

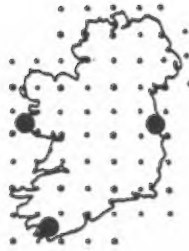
FIGURE 1: continued



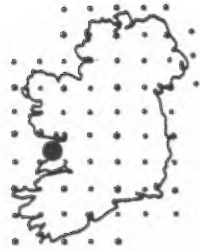
Dicranomyia
(*Dicranomyia*)
modesta



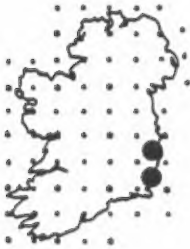
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(*Dicranomyia*)
omissinervis



Dicranomyia
(*Dicranomyia*)
sera



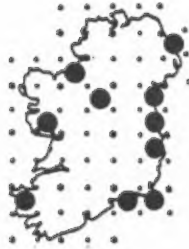
Dicranomyia
(*Glochina*)
sericata



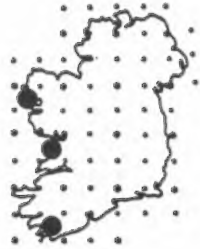
Dicranomyia
(*Idiopyga*)
danica



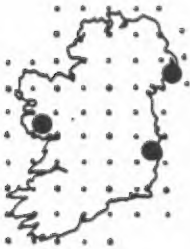
Dicranomyia
(*Melanolimonia*)
caledonica



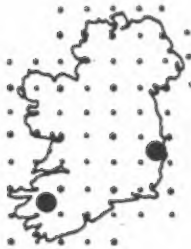
Dicranomyia
(*Melanolimonia*)
morio



Dicranomyia
(*Melanolimonia*)
stylifera



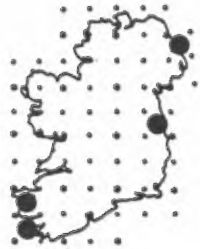
Dicranomyia
(*Numantia*)
fusca



Dicranomyia
(*Sivalimnobia*)
aquosa

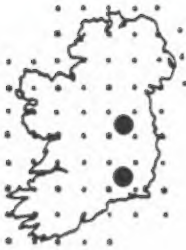


Geranomyia
bezzi



Geranomyia
unicolor

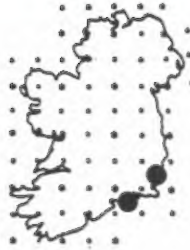
FIGURE 1: continued



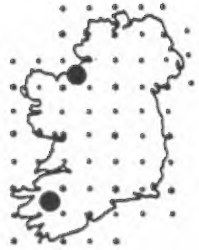
*Helius
flavus*



*Helius
longirostris*



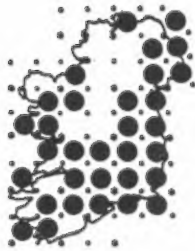
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pallirostris*



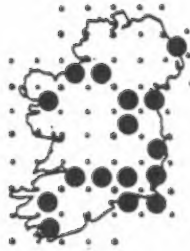
*Limonia
flavipes*



*Limonia
macrostigma*



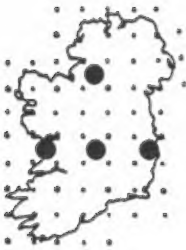
*Limonia
nubeculosa*



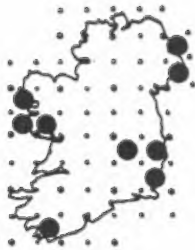
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phragmitidis*



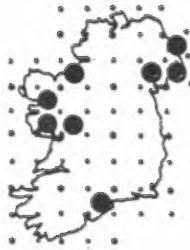
*Limonia
trivittata*



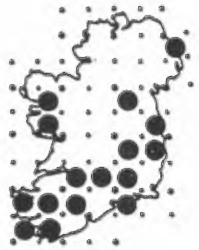
*Lipsothrix
remota*



*Metalimnobia
(Metalimnobia)
bifasciata*

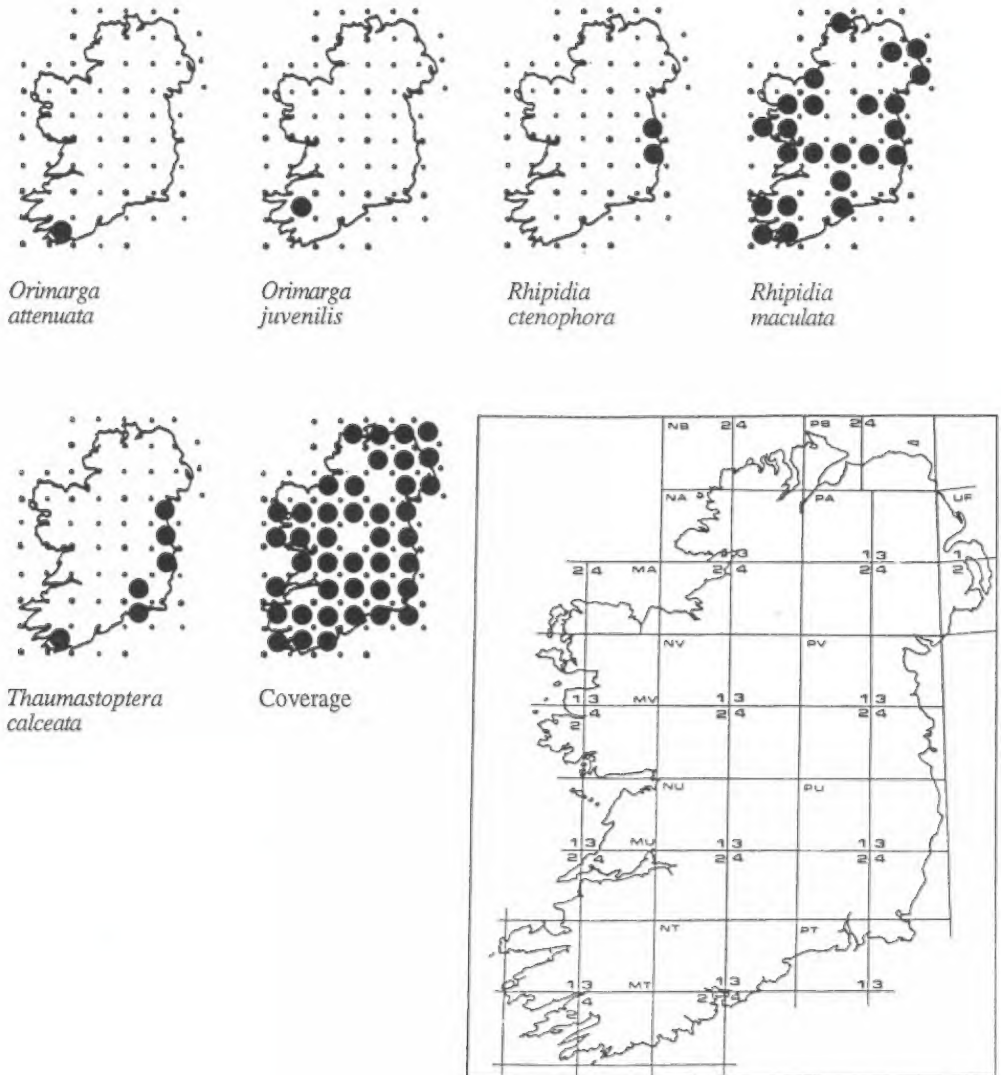


*Metalimnobia
(Metalimnobia)
quadrinotata*



*Neolimonia
dumetorum*

FIGURE 1: continued



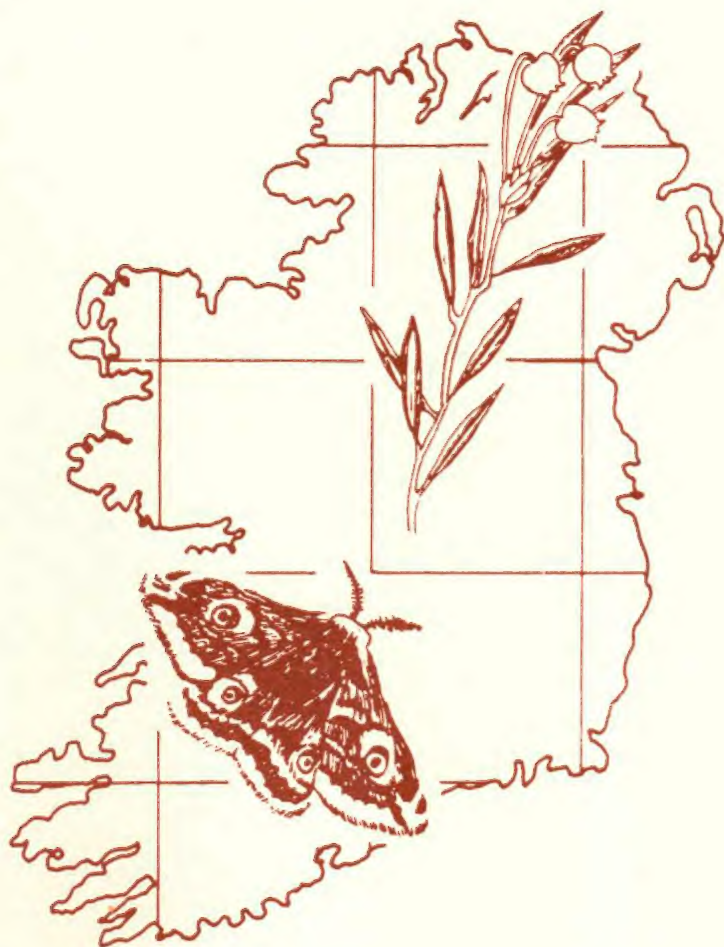


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THIS BULLETIN IS DEDICATED TO THE MEMORY OF PROFESSOR BRYAN P. BEIRNE (1918-1998), MRJA, FRES, FLS, FZS, FESC, IN RECOGNITION OF HIS MAGNIFICENT CONTRIBUTION TO IRISH AND CANADIAN ENTOMOLOGY.

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**THE DISTRIBUTION OF AQUATIC COLEOPTERA IN NORTHERN IRELAND. PART
2: FAMILIES HYDRAENIDAE, HELOPHORIDAE, HYDROCHIDAE,
HYDROPHILIDAE, ELMIDAE AND DRYOPIDAE**

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Summary

1. Sixty two species of aquatic Coleoptera in the families Hydraenidae, Helophoridae, Hydrochidae, Hydrophilidae, Elmidae and Dryopidae are recorded from Northern Ireland.
2. The distribution of these species is mapped. Records have been gathered intensively since 1988 from 313 sites covering all counties and biotopes.

Introduction

This paper is the second part of an intended series detailing the distribution of aquatic Coleoptera in Northern Ireland. The first covered the aquatic Adephaga in the families Haliplidae, Hygrobiidae, Noteridae, Dytiscidae and Gyrinidae (Nelson *et al.*, 1997). This paper covers 63 species in the families Hydraenidae, Helophoridae, Hydrochidae, Hydrophilidae, Elmidae and Dryopidae. The nomenclature and taxonomic order follows the Irish checklist (Anderson *et al.*, 1997).

Literature and study of the Northern Irish fauna

The history of recording and the literature pertaining to the aquatic Coleoptera is covered in the first paper on the Adephaga (Nelson *et al.*, 1997). In comparison to the aquatic Adephaga, there is a greater deal of nomenclatural uncertainty with species in these families and many old published records cannot be accepted unless vouchers exist. As with the other aquatic beetles the number of modern records far exceed the number of old records, so relatively little effort has been put into researching old records which add little if anything of value.

Within these families the definition of what constitutes an aquatic species becomes blurred. The species of Hydrophilidae are particularly difficult to define as aquatic or not, especially within *Cercyon*. Apart from four *Cercyon* species which are most closely tied to water, the other *Cercyon* species, *Sphaeridium* and *Megasternum obscurum* (Marsham) are not included. A summary statement of the status of the non-aquatic species in the Hydrophilidae and other families is given in Nelson (1997).

Identification of the species

Friday (1988) provides the most comprehensive keys for the Irish fauna. Alternative, more detailed keys can be found in Hansen (1987) and Drost *et al.* (1992).

Species Accounts

The following accounts are arranged in the systematic order following Anderson *et al.*, 1997. For each species a brief account is given describing the observed distribution, ecological information and a discussion where appropriate of the significance of the Northern Irish records. Following each species account is a list of the sites at which the species has been recorded by the authors since 1988. Site details are given in Appendix 1. The distribution of each species is mapped and this includes all the listed records plus the additional records held on the CEDaR database. The black dots signify post-1988 records. The maps are plotted on a tetrad basis using the DMAP mapping software.

In the accounts and Appendix 1, the county names refer, unless stated otherwise, to the political counties. These differ from the biological vice-counties used in Balfour-Browne (1951) in that the portion of Londonderry to the west of the River Foyle is included in the vice-county of East Donegal.

HYDRAENIDAE

A family of small rather elongate beetles in three genera. Most of the species are found in running water or saltmarshes. Many are considered rare though this may be biased by difficulty in sampling their often specialised habitat. Of the 23 species recorded in Ireland, there have been records of 17 in Northern Ireland.

1. *Hydraena britteni* Joy, 1907 (Fig. 1)

A locally distributed fen species which is found also in cutover raised bogs and recorded from suitable habitat in all counties.

Sites: 83, 85, 97, 99, 123, 146, 149, 175, 207, 238, 243.

2. *Hydraena gracilis* Germar, 1824 (Fig. 2)

A common and widespread species in northern and western Britain where its habitat of mossy rocks along fast-flowing streams and rivers is most common. Irish records are relatively fewer and confined to upland areas (Balfour-Browne, 1958) including counties Antrim, Armagh, Down and Londonderry. The only recent records are from typical habitat in Antrim and Fermanagh. Further surveys of rivers are needed to ascertain its true status.

Sites: 35, 71, 87, 263, 303, 306.

3. *Hydraena minutissima* Stephens, 1829

A riverine species typically found in rapidly-flowing streams. There are records from Londonderry, West Cork, North Kerry and Wicklow (Balfour-Browne, 1951). A record from Armagh is shown on the map in Balfour-Browne (1958). There are no recent records from anywhere in Ireland.

4. *Hydraena nigrita* Germar, 1824 (Fig. 3)

Hydraena nigrita occurs, like most *Hydraena*, in running unpolluted water including woodland streams (Hansen, 1987) and extremely shallow running water (Foster, 1994a). In Britain it is the third-commonest of the running-water species (Foster, 1990). However there are few claimed Irish records and Balfour-Browne (1958), because of confusion in identification of many records, was confident in only his single Irish record from Antrim. It has subsequently only been found twice in Ireland, in a stream on the Stormont Estate, Down and in Clare (Bilton, 1988).

Site: 310.

5. *Hydraena pulchella* Germar, 1824

There are no recent records from anywhere in Ireland. It has previously been recorded from Armagh, Down, Antrim and Londonderry (Balfour-Browne, 1951). Like most *Hydraena* species it is found beside running water especially where the edge is silty (Foster, 1990) or grassy (Balfour-Browne, 1958). The records show it has a very scattered distribution in Britain north to southern Scotland (Foster, 1990), but there are relatively few recent records (Foster, 1994a). It can be common at individual sites (Hansen, 1987). Balfour-Browne (1958) describes finding it in numbers beside a stream at the edge of Killough Harbour, Down.

6. *Hydraena riparia* Kugelann, 1794 (Fig. 4)

One of the commonest and most widespread *Hydraena* species in Britain found at the edges of ponds and streams. It has been recorded widely in Ireland including all counties of Northern Ireland except Tyrone (Balfour-Browne, 1951). Since 1988, there have been scattered records in Armagh, Down, Fermanagh and Tyrone in typical habitat.

Sites: 15, 35, 63, 167, 215, 221, 226, 242, 253, 255, 272, 284, 292, 296, 299.

7. *Hydraena rufipes* Curtis, 1830

A riverine species for which there are no recent Northern Irish records. Balfour-Browne (1951) lists Armagh as one of the seven vice-counties in which it has been collected, but in his later publication (Balfour-Browne, 1958) he mentions that there are only three Irish records from counties Carlow, Kerry and Meath. The status of *H. rufipes* in Northern Ireland must therefore be unconfirmed. *H. rufipes* is usually found beside rivers amongst moss and fine shingle but also in exposed quarry ponds (Foster, 1990).

8. *Limnebius nitidus* (Marsham, 1802)

This is one of the smallest water beetles and is found in wet mud and amongst mosses at the edge of pools and streams. There are no recent records, but records from all five counties, except Tyrone, are listed in Balfour-Browne (1951).

9. *Limnebius truncatellus* (Thunberg, 1794) (Fig. 5)

A common species found beside a wide variety of lowland pools and streams. Recorded from all counties.

Sites: 6, 30, 35, 46, 48, 60, 63, 64, 71, 87, 88, 101, 105, 110, 120, 146, 149, 150, 151, 153, 161, 167, 197, 213, 218, 221, 226, 240, 242, 246, 263, 293, 295, 302, 306, 309.

10. *Ochthebius auriculatus* Rey, 1885 (Fig. 6)

There are two recent records of this saltmarsh species from the east shore of Strangford Lough and Dundrum Inner Bay, both in Down. There have been no previous Northern Irish records. The Irish distribution is limited to the east coast counties of Wicklow, Dublin and Meath (Balfour-Browne, 1951).

Sites: 261, 312.

11. *Ochthebius bicolon* Germar, 1824 (Fig. 7)

A riverine *Ochthebius*, recorded from one locality in north Antrim, apparently the only modern Irish record. Old records are few and unacceptable without vouchers as, in the past, this species was confused with *O. dilatatus*. Lack of appropriate recording in its bankside habitat may mean the species has been under-recorded.

Site: 100.

12. *Ochthebius dilatatus* Stephens, 1829 (Fig. 8)

Ochthebius dilatatus is found beside still water, both brackish and fresh. There is a strong coastal bias to the recent records which cover the east and north coast from Dundrum Bay, Down to Lough Foyle, Londonderry. The only inland record is from a turlough in Fermanagh.

Sites: 27, 100, 109, 122, 156, 183, 213, 234.

13. *Ochthebius exsculptus* Germar, 1824 (Fig. 9)

This is a riverine species found on fast-flowing, usually base-rich rivers. Like all bank-dwelling species it requires specific searching and is unlikely to be taken by kick-sampling. In Balfour-Browne (1951) it is indicated as recorded from six Irish vice-counties including Down and Londonderry. However Balfour-Browne (1958) refers to it being present in only 5 vice-counties, and the map indicates it to be present in Antrim. This map is repeated in Foster (1990). There is only one recent record from a small river in Antrim. Here it was taken on a moss-covered rock in mid-stream together with the rare staphylinid *Gnypeta caerulea* (Sahlberg).

Site: 311.

14. *Ochthebius lejolisi* Mulsant and Rey, 1861 (Fig. 10)

The habitat of this species is very distinctive and it is usually the only beetle species found in it. It occurs in rock pools, often with fringing areas of *Enteromorpha*, within the splash zone.

On individual stretches of suitable habitat, however, it is often very localised and missing from many apparently suitable pools (Foster, 1990). The broad Irish distribution of *Ochthebius lejolisi* has been well-recorded (Balfour-Browne, 1951) and the recent records only fill in a few of the gaps on the east coast between Newcastle, Down and Cushendun, Antrim.

Sites: 174, 197.

15. *Ochthebius marinus* (Paykull, 1798) (Fig. 11)

A saltmarsh species found along the east and south coast of Ireland including Down and Antrim (Foster, 1990). The few post-1988 records have been from brackish pools around Strangford Lough and at Strand Lough, Killough, all in Down.

Sites: 189, 234, 261, 265.

16. *Ochthebius minimus* (Fabricius, 1792) (Fig. 12)

This is the most widespread member of the genus found in many types of water. Old records indicate it has a widespread distribution in Ireland including Armagh, Antrim, Down and Londonderry. The only recent record from Northern Ireland has been from a eutrophic drain in Fermanagh. However, it has been taken in a number of sites in central Ireland (Bilton, 1988; Bilton and Lott, 1991).

Site: 15.

17. *Ochthebius punctatus* Stephens, 1829 (Fig. 13)

Confined to brackish water, this can be a common species in the right habitat. Old records suggest this is the commonest species of brackish-water *Ochthebius* in Ireland. It has been recorded in suitable habitat around most of the Irish coast (Balfour-Browne, 1958). Since 1988, it has been collected in saltmarsh pools and brackish ditches in Larne Lough, Antrim and Belfast, Strangford and Carlingford Loughs, Down.

Sites: 162, 170, 182, 189, 234, 261, 265.

18. *Ochthebius viridis* Peyron, 1858 (Fig. 14)

A saltmarsh beetle with only one previous Northern Irish record from Armagh (Balfour-Browne, 1951, 1958). This must mean it was recorded along the tidal shore below Newry, the only area of coastline in this county. There is one recent record from the saltmarsh at Horse Island on the east shore of Strangford Lough, Down. In the rest of Ireland it has been recorded

Site: 261.

round much of the coast except the north.

HELOPHORIDAE

19. *Helophorus aequalis* Thomson, 1868 (Fig. 15)

Common and widespread. Found at grassy edges to pools and lakes throughout lowlands but also locally in the uplands up to 350m. It has been recorded in all counties.

Sites: 3, 4, 5, 15, 19, 30, 32, 38, 44, 46, 47, 49, 56, 59, 64, 68, 70, 71, 72, 75, 84, 85, 88, 95, 101, 103, 108, 109, 110, 111, 116, 118, 119, 122, 127, 130, 133, 134, 135, 141, 148, 149, 151, 154, 157, 161, 168, 180, 182, 187, 191, 199, 209, 213, 215, 216, 219, 225, 235, 236, 239, 241, 242, 244, 253, 254, 255, 257, 262, 263, 265, 270, 274, 275, 276, 277, 281, 282, 283, 284, 286, 295, 307.

20. *Helophorus alternans* Gén  , 1836

In Britain, this uncommon species is found in saltmarshes and occasionally inland in heathland pools. The sole basis for its inclusion on the Irish list rests on a single record by Buckle in 1900 from Culmore Moss, Londonderry (but in the vice county of East Donegal) (Balfour-Browne, 1951). As this is a southern European species, which in Britain is established only in south-east England, this record far to the north of its normal range, is likely to have been a migrant specimen. Its status in Scotland is also considered to be that of a very occasional migrant (Foster, 1994a).

21. *Helophorus arvern  cus* Mulsant, 1846 (Fig. 16)

There are pre-1950 records of *Helophorus arvern  cus* from vice-counties Antrim, Down and Londonderry (Balfour-Browne, 1951). The list in Balfour-Browne (1958) excludes Down. These records are the only previous Irish ones. The only recent record is from the tidal stretch of the Bann Estuary, Londonderry. This species is found on sandy or muddy edges of rivers, including tidal stretches, so it is probably under-recorded. In Britain, it is commonest in the north and west and particularly southern Scotland (Foster, 1987).

Site: 313.

22. *Helophorus brevipalpis* Bedel, 1881 (Fig. 17)

This is a widespread and abundant species found in many aquatic habitats, and one of the commonest beetles in Britain and Ireland.

Sites: 3, 5, 6, 9, 15, 18, 19, 24, 25, 30, 32, 33, 38, 39, 42, 44, 46, 47, 52, 53, 55, 56, 57,

59, 60, 64, 68, 71, 72, 75, 78, 81, 82, 84, 87, 88, 90, 92, 100, 101, 103, 105, 107, 108, 109, 110, 111, 112, 115, 116, 117, 118, 119, 120, 122, 125, 126, 127, 128, 130, 131, 132, 134, 135, 137, 138, 141, 143, 146, 147, 148, 149, 150, 151, 152, 153, 154, 156, 157, 160, 161, 163, 164, 167, 169, 175, 177, 178, 180, 181, 182, 185, 187, 189, 190, 192, 197, 201, 204, 205, 207, 209, 211, 212, 215, 218, 219, 220, 221, 224, 229, 232, 233, 234, 236, 237, 238, 239, 242, 248, 249, 252, 253, 254, 256, 257, 262, 263, 264, 270, 272, 273, 276, 277, 279, 281, 282, 284, 285, 292, 293, 294, 295, 297, 298, 300, 301, 302, 307.

23. *Helophorus flavipes* (Fabricius, 1792) (Fig. 18)

A very common and widespread species found throughout Northern Ireland. In parts of its range, it is considered a species of acid waters but it is much more general here occurring beside non-acid pools and streams.

Sites: 2, 3, 5, 6, 8, 12, 13, 14, 15, 16, 17, 18, 19, 27, 31, 32, 33, 38, 46, 47, 49, 54, 58, 59, 65, 68, 69, 70, 71, 74, 75, 77, 81, 83, 84, 88, 90, 92, 96, 99, 104, 105, 106, 108, 110, 114, 118, 119, 121, 127, 134, 135, 143, 146, 154, 160, 163, 164, 171, 173, 176, 181, 187, 190, 191, 192, 195, 199, 205, 213, 214, 215, 219, 223, 230, 234, 236, 239, 245, 246, 249, 255, 257, 263, 272, 273, 288, 295, 309.

24. *Helophorus fulgidicollis* Motschulsky, 1860 (Fig. 19)

This is a strictly brackish species which formerly was considered a variety (*mulsanti*) of *Helophorus flavipes* (Balfour-Browne, 1951, 1958). In Ireland, it is confined to suitable habitat on the east and south coast from Kerry to Down. The only recent Irish records of this species are from saltmarshes on the shores of Carlingford and Strangford Loughs, Down.

Sites: 170, 261.

25. *Helophorus grandis* Illiger, 1798 (Fig. 20)

A common inhabitant of shallow waters by ponds and lakes. It is often associated with *Helophorus aequalis*, but *H. grandis* is much less common and less widespread.

Sites: 6, 27, 30, 31, 47, 79, 80, 82, 83, 85, 90, 111, 122, 135, 138, 146, 151, 175, 181, 217, 219, 242, 249, 253, 272, 276, 279, 281, 282, 283, 285, 307.

26. *Helophorus granularis* (Linnaeus, 1761)

A springtime species of shallow, grassy pools which is very locally distributed throughout its range. There are no recent records, but there are records from Down, Antrim and Londonderry

(Balfour-Browne, 1951). The recorded Irish distribution suggests a coastal distribution which also appears to be the pattern in Britain.

27. *Helophorus minutus* Fabricius, 1775 (Fig. 21)

In Britain, this is a common species of shallow grassy pools. This habitat has not received much attention in Northern Ireland, and there are few recent records from suitable pools and the edges of streams in coastal districts and at the margins of the large inland lakes.

Sites: 79, 101, 122, 159, 182, 192, 196, 234.

28. *Helophorus obscurus* Mulsant, 1844 (Fig. 22)

In Northern Ireland, this species, which is very similar to *Helophorus flavipes*, is uncommon. The few well-scattered records are from the edges of coastal pools, streams and base-rich fens in Down, Armagh, Fermanagh and Londonderry.

Sites: 82, 85, 98, 120, 156, 157, 183, 263, 297, 303.

29. *Helophorus strigifrons* Thomson, 1868

Like many *Helophorus*, *H. strigifrons* is found in shallow temporary pools with sedges and rushes (Friday, 1988). This habitat type has not received much attention and there are no recent records of the species. According to Balfour-Browne (1958), it has been collected in four Irish vice-counties, including Antrim.

HYDROCHIDAE

30. *Hydrochus brevis* (Herbst, 1793) (Fig. 23)

Very rare with just two modern Irish records from Brackagh Bog NNR Armagh, in June 1989 and a site in south-east Fermanagh in 1995. This is a fenland species which in Britain has a very disjunct distribution from northern Scotland to East Anglia and which has suffered a severe decline (Foster, 1987). The only Irish records are from Down and Antrim (Balfour-Browne, 1951). These records in fact all refer to the Moira/Soldierstown area where the species has been taken "in the canal near Moira" by C. W. Buckle, "close to the road bridge near Soldierstown in Antrim" by W. M. Crawford, and on the "Antrim side of Moira" by Prof. F. Balfour Browne (Crawford, 1939). The Buckle record, which is the one published in Johnson and Halbert (1902), was ascribed by Balfour-Browne to Down (Crawford, 1939), though the basis for this supposition is not known but which accounts for this vice-county record.

Therefore the previous records of *H. brevis*, whilst probably not from the exact same sites, are

clearly all from a narrow circumscribed area along the now disused Lagan Canal.

Sites: 5, 253.

31. *Hydrochus ignicollis* Motschulsky, 1860 (Fig. 24)

This species has previously been confused with *Helophorus elongatus* (Schaller), which is not believed to have occurred in Ireland. Old records under this name probably refer to this species, but can only be accepted if vouchers exist. There are old records of *H. elongatus sensu lato* from Armagh, Down and Antrim (Balfour-Browne, 1958) but no vouchers have been traced. There is a specimen of this species in the Ulster Museum amongst a small collection of beetles from Fermanagh. The data label reads Carrickreagh 11 June 1941. The name of the collector is unknown. There are only two post-88 records, both from mossy calcareous fens beside marl lakes in south-east Fermanagh. It has been recorded from single sites in Clare (Owen, 1997) and Westmeath (Bilton, 1988). *H. ignicollis* is considered very rare in Britain where it is confined to ancient fens in south-eastern England with an outlying record in Anglesey (Foster, 1987). The true *H. elongatus* has a similar distribution to this species, but can also be found in disturbed and new sites.

Sites: 172, 229.

HYDROPHILIDAE

32. *Coelostoma orbiculare* (Fabricius, 1775) (Fig. 25)

This is a fen species which is frequent in the interdrumlin fens of Down and Armagh, but is not uncommon in the rest of the province in more acid bogs. There are records from all counties.

Sites: 18, 20, 29, 54, 67, 70, 84, 88, 89, 90, 99, 105, 122, 157, 177, 181, 186, 194, 195, 205, 210, 218, 229, 230, 236, 239, 242, 247, 252, 253, 254, 257, 259, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 281, 282, 283, 284, 285, 286, 288, 291, 307, 308.

33. *Cercyon convexiusculus* Stephens, 1829 (Fig. 26)

This is a frequent species in the mossy fens of Down and Armagh and also a few sites in Fermanagh.

Sites: 48, 84, 89, 99, 146, 149, 151, 157, 177, 186, 218, 246, 253, 254, 257, 267, 271, 272, 277, 279, 282, 283, 285, 286, 307, 308.

34. *Cercyon marinus* Thomson, 1853 (Fig. 27)

Regarded as a rare species by Johnson and Halbert (1902) but found in numbers on a Lough Neagh sandy beach at Rea's Wood NNR, at saltmarshes in the Harbour Estate, Belfast, in the Quoile Pondage and inland fens in Down and Fermanagh recently. A species of decaying organic matter or moss in water margin habitats.

Sites: 48, 122, 177, 182, 202, 219, 277, 285, 309.

35. *Cercyon tristis* (Illiger, 1801) (Fig. 28)

Recorded in recent years from a variety of habitats including estuarine water meadows, riverine fen and a rubbish dump. Added to the Irish list by Halbert (1910) from Shane's Castle on Lough Neagh, and possibly more widespread currently than it was earlier in the century.

Sites: 149, 182, 242, 279.

36. *Cercyon ustulatus* (Preyssler, 1790) (Fig. 29)

In 1997, this species was found in pitfall traps often in large numbers on 13 fen sites in south Armagh, and south and east Down. The only other recent record is from sandy shores in the north-eastern corner of Lough Neagh.

Sites: 29, 89, 151, 158, 186, 205, 206, 277, 279, 280, 282, 283, 284, 285, 307.

37. *Paracymus scutellaris* (Rosenhauer, 1856) (Fig. 30)

A heathland species which is typically found in upland seepages and is a highly characteristic 'Atlantic' species of the west of Britain and Ireland. Prior to 1988 there were no Northern Ireland records. Since then, it has been collected at several sites in the Mourne and on a lowland raised mire in Fermanagh. The lack of records from other areas could be due to the lack of sampling in its preferred habitat rather than a genuine absence.

Sites: 110, 119, 154, 181, 288, 291.

38. *Hydrobius fuscipes* (Linnaeus, 1758) (Fig. 31)

Common and widespread in lowland pools and fens in all counties though scarce north of Lough Neagh.

Sites: 5, 18, 29, 37, 47, 48, 51, 60, 61, 68, 70, 72, 75, 77, 79, 80, 82, 83, 84, 85, 86, 87, 88, 89, 94, 97, 98, 99, 101, 102, 103, 112, 113, 114, 119, 121, 122, 127, 139, 146, 148, 149, 150, 151, 154, 156, 157, 158, 161, 162, 163, 166, 168, 171, 172, 175, 179, 181, 182, 184, 185, 186, 187, 194, 196, 201, 204, 205, 207, 210, 212, 218, 222, 227, 228, 229, 236,

242, 243, 245, 246, 247, 249, 253, 254, 257, 258, 259, 260, 267, 270, 271, 273, 275, 276, 277, 278, 279, 281, 282, 283, 284, 285, 286, 287, 307.

39. *Anacaena globulus* (Paykull, 1798) (Fig. 32)

This is one of the most commonly recorded of the aquatic Coleoptera. It is recorded from all counties beside many still-water habitats, streams and rivers from sea-level to over 470m and on small offshore islands.

Sites: 1, 5, 6, 7, 10, 12, 13, 15, 18, 20, 21, 23, 35, 36, 38, 40, 42, 43, 46, 48, 50, 53, 54, 61, 62, 64, 65, 66, 68, 70, 71, 75, 77, 83, 84, 85, 86, 87, 88, 89, 91, 92, 93, 94, 96, 99, 103, 104, 105, 106, 107, 108, 109, 111, 112, 114, 116, 118, 119, 121, 123, 129, 140, 140, 144, 145, 146, 148, 151, 153, 154, 155, 156, 157, 161, 171, 176, 177, 181, 186, 187, 188, 193, 196, 198, 199, 201, 202, 204, 210, 212, 218, 219, 220, 227, 228, 229, 231, 234, 236, 238, 239, 241, 243, 247, 250, 251, 252, 253, 254, 258, 259, 263, 266, 270, 271, 272, 276, 278, 283, 285, 286, 287, 289, 291, 297, 302, 303.

40. *Anacaena limbata* (Fabricius, 1792) (Fig. 33)

This is found in productive fens, and is the least common of the three Irish *Anacaena* species. The majority of sites at which it has been recorded are fens by Upper Lough Erne and Lough Neagh. There are no records from Antrim and Londonderry away from Lough Neagh.

Sites: 6, 11, 18, 23, 37, 76, 77, 79, 82, 99, 103, 127, 149, 169, 172, 175, 181, 195, 196, 204, 205, 217, 238, 242, 246, 247, 250, 253, 258, 275, 277, 278, 279, 281, 282, 284, 286.

41. *Anacaena lutescens* (Stephens, 1829) (Fig. 34)

This small beetle is very frequent in the south-eastern fens, often with *Anacaena globulus*. The distribution is a southern one with only a few records in north Antrim and Londonderry. Sites: 11, 18, 55, 75, 80, 83, 84, 85, 89, 90, 91, 97, 98, 99, 102, 103, 113, 119, 121, 122, 123, 129, 136, 146, 148, 149, 152, 154, 165, 169, 175, 177, 201, 202, 204, 208, 212, 213, 215, 219, 229, 238, 242, 246, 247, 248, 250, 251, 253, 254, 257, 267, 268, 271, 273, 285, 286, 303.

42. *Laccobius atratus* (Rottenberg, 1874) (Fig. 35)

Like *Paracymus scutellaris*, this is a characteristic species of Atlantic peat mosses, but it is found further east in Britain and has only once been recorded in Scotland. There are records from the west coast from Kerry to Mayo (Friday, 1987) and Donegal (B. Nelson, unpublished

record). In Northern Ireland, it has been found commonly in areas of flushed heath in the Mourne, Down, and two similar sites in Antrim and Fermanagh.

Sites: 5, 34, 104, 105, 106.

43. *Laccobius atrocephalus* Reitter, 1872 (Fig. 36)

A riverine species found in the muddy and silty edges of rivers and streams. There are a few widely scattered recent records in Fermanagh, Down and Antrim. Like all species which predominantly inhabit river margins, its true distribution is still unclear due to a lack of sampling in its main habitat. The few old records from just three vice-counties, do however suggest it is one of the rarer Irish *Laccobius*. Foster (1995) however considered it to be the commonest species in Kerry.

Sites: 71, 87, 197, 211, 263.

44. *Laccobius biguttatus* Gerhardt, 1877 (Fig. 37)

There are records from fens and the muddy margins of base-rich ponds in the Erne valley, the south-west shore of Lough Neagh and the south-west corner of Strangford Lough.

Sites: 122, 136, 147, 157, 159, 164, 211, 225, 240, 242, 248, 258, 262, 274, 279.

45. *Laccobius bipunctatus* (Fabricius, 1775) (Fig. 38)

This is the most commonly recorded species of *Laccobius* with many records from fens in the south and east. The species is largely absent from the north and west.

Sites: 20, 29, 30, 39, 41, 45, 56, 85, 88, 91, 98, 99, 135, 141, 151, 164, 166, 167, 172, 177, 186, 199, 200, 229, 252, 254, 269, 270, 273, 276, 282, 288, 289.

46. *Laccobius minutus* (Linnaeus, 1758) (Fig. 39)

The recent records show this is a relatively common species in Fermanagh, but much scarcer in all other counties and not recorded from Tyrone. The majority of the records are from grassy edges of lakes which is its typical habitat in Britain.

Sites: 55, 73, 80, 118, 126, 135, 137, 165, 180, 206, 215, 224, 237, 248, 249, 251, 252.

47. *Laccobius sinuatus* Motschulsky, 1849

This uncommon species is listed as being found in Down by Balfour-Browne (1951) and in five other Irish vice-counties. It is found on the bare edges of streams and flushes (Hansen, 1987). There are no recent records from anywhere in Ireland and it is possible that there has been confusion with *Laccobius bipunctatus*.

48. *Laccobius striatulus* (Fabricius, 1801) (Fig. 40)

Stony edges to lakes and rivers are the major habitat of this species. Antrim, Down and Fermanagh are the only counties with recent records. Most of the records are from the margins of Upper and Lower Lough Erne and their satellite loughs. There have also been records from a stream in Antrim and two sandpits in Down.

Sites: 55, 77, 124, 126, 215, 232, 237, 249, 263, 309.

49. *Enochrus affinis* (Thunberg, 1794) (Fig. 41)

Typically a bog land species, this species shows a noticeably northern and western distribution within Northern Ireland from western Fermanagh, through the uplands in Tyrone and Londonderry to north Antrim. It has been collected in sites with relict habitat in Down.

Sites: 13, 28, 61, 66, 81, 83, 88, 99, 102, 119, 171, 181, 188, 195, 212, 219, 230, 243, 246, 257.

50. *Enochrus bicolor* (Fabricius) (Fig. 42)

This is a brackish pool species which has been recorded in both Antrim and Down in the past (Balfour-Browne, 1951). There have been two recent records, both from brackish pools, on the shores of Strangford Lough, Down.

Sites: 162, 189.

51. *Enochrus coarctatus* (Gredler, 1863) (Fig. 43)

The most commonly recorded species of *Enochrus* in Northern Ireland and in the rest of Ireland. It is a species of productive fens and is most commonly recorded south of Lough Neagh.

Sites: 20, 42, 70, 77, 80, 84, 89, 91, 99, 112, 122, 132, 141, 142, 145, 146, 148, 151, 157, 168, 169, 171, 177, 181, 186, 198, 202, 212, 217, 218, 219, 230, 235, 240, 242, 246, 247, 252, 253, 254, 257, 259, 260, 267, 269, 271, 273, 278, 279, 281, 282, 283, 284, 285, 288, 291.

52. *Enochrus fuscipennis* (Thomson, 1884) (Fig. 44)

This taxon is possibly a complex represented by more than one species in Ireland. *E. fuscipennis* is a frequent species of flushed heaths and bogs. The majority of recent records are from the north and west in north Antrim, the Sperrins of Londonderry and Tyrone and west Fermanagh. The species also occurs in flushed heaths in the Mourne. Armagh is the only

county without a recent record.

Sites: 13, 54, 83, 88, 96, 105, 110, 119, 122, 154, 171, 181, 195, 196, 239, 288.

53. *Enochrus ochropterus* (Marsham, 1802) (Fig. 45)

Enochrus ochropterus is the lowland and fenland counterpart of *E. fuscipennis*. Most of the recent records are from Down and Armagh with no more than two records from each of the other four counties.

Sites: 65, 157, 180, 181, 195, 196, 230, 240, 246, 252, 253, 254, 257, 275, 280.

54. *Enochrus testaceus* (Fabricius, 1801) (Fig. 46)

This is a locally common fen species which is frequent in the Down fens but much scarcer in other counties and not recorded from Tyrone.

Sites: 20, 42, 80, 84, 89, 105, 112, 118, 157, 166, 168, 172, 177, 181, 198, 203, 208, 209, 210, 212, 217, 228, 234, 242, 253, 257, 278, 281, 283.

55. *Cymbiodyta marginella* (Fabricius, 1792) (Fig. 47)

Apart from one record from a lake-side fen in Fermanagh, this uncommon fenland species is confined to a few sites in eastern Down. These include shallow pools in reclaimed estuarine ground in the Belfast Harbour Estate and natural fens. These are the first records from Northern Ireland since 1900. The only previous record was from a pool on Binevenagh in northern Londonderry (Crawford, 1936).

Sites: 151, 157, 182, 217, 242, 279.

56. *Chaetarthia seminulum* (Herbst, 1797) (Fig. 48)

This is one of the smallest aquatic Coleoptera. It has been recognised that there is a second species of *Chaetarthia*, *C. similis* Wollaston in western Europe, which is found beside running water (Foster, 1994b). *C. seminulum sensu stricto* is found in wet mud by pools and seepages and it is more often taken in pitfalls than by conventional netting. All Irish material which has been checked has proved to be this species. Old records are unreliable unless vouchers exist. Most of the few Northern Irish records of this undoubtedly under-recorded beetle have been collected in the Down fens.

Sites: 84, 89, 105, 157, 218, 219, 242, 254, 271, 279, 286, 289.

ELMIDAE

57. *Elmis aenea* (Müller, 1806) (Fig. 49)

Occurs in moss-covered rocks in swift rivers and streams. The data in Roberts and Mackie (1993) shows it to be a very common species in the Foyle system and present in all the other rivers covered in this survey. Further work will probably show it occurs in suitable riverine habitat throughout Northern Ireland.

Sites: 7, 22, 33, 35, 63, 71, 74, 87, 101, 167, 206, 221, 266, 292, 293, 296, 297, 299, 301, 302, 303, 304, 305, 306.

58. *Esolus parallelepipedus* (Müller, 1806) (Fig. 50)

There are three recent records of this species, two from Fermanagh and one from Antrim. As this is a riverine species, which lives interstitially in the main flow, it is likely to be under-recorded.

Sites: 35, 71, 107.

59. *Limnius volckmari* (Panzer, 1793) (Fig. 51)

A riverine species which lives amongst fine gravel in clean fast rivers and is easily detected by kick-samples. It is very common in the Foyle system (Roberts and Mackie, 1993) and present in many other rivers throughout all counties where suitable habitat is found.

Sites: 107, 167, 263, 292, 296, 297, 300, 301, 306.

60. *Oulimnius tuberculatus* (Müller, 1806) (Fig. 52)

Common and widespread, found amongst gravel in rivers and also exposed shores of clean lakes. It has been found in all counties in Northern Ireland with most of the records from rivers.

Sites: 71, 87, 96, 110, 111, 167, 224.

DRYOPIDAE

61. *Dryops ernesti* des Gozis, 1886 (Fig. 53)

There are only a few recent records of this apparently rare species, mainly beside rivers in Antrim. It is a northern and western species in the British Isles, typically of acid pools in moorlands.

Site: 87.

62. *Dryops luridus* (Erichson, 1847) (Fig. 54)

This is a widespread species found beside a wide variety of lowland waters in all counties.

Sites: 55, 87, 92, 107, 119, 130, 164, 165, 197, 212, 224, 240, 254, 257, 290.

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APPENDIX 1. List of sites sampled by authors.

Site No., Site Name, Grid reference, County

Brief habitat description

- 1 Faughanvale River C581222 Co. Londonderry.
Small modified river near mouth. Stony bed and vertical banks.
- 2 Lough Nabradagh H493397 Co. Fermanagh.
Small lake in afforested blanket bog.
- 3 Meenloughabank H053497 Co. Fermanagh.
Peaty drain in upland fen.
- 4 Glencreawan Lough H030567 Co. Fermanagh.
Exposed upland lake.
- 5 South-east of Inver Lough H525308 Co. Fermanagh.
Lowland fen.
- 6 Gortalughany stream H174303 Co. Fermanagh.
Small stream.
- 7 Lough Achork H044555 Co. Fermanagh.
Mesotrophic lake with open fen on exposed sandy shore.
- 8 Drumanacabranagher H208356 Co. Fermanagh.
Cutover raised bog with blanket bog.
- 9 Lough Acrussel H256411 Co. Fermanagh.
Lowland eutrophic lake.
- 10 New Lough H499842 Co. Tyrone.
Small lake in heath.
- 11 Breandrum Lough H250432 Co. Fermanagh.
Kettle hole lake with dense alder carr.
- 12 Fairywater Bog (Claraghmore) H354761 Co. Tyrone.
Cutover raised bog with flooded peat cuttings.
- 13 Meenadoan NNR H246719 Co. Tyrone.
Unplanted blanket bog in conifer plantation.

- 14 Gortgranagh H350293 Co. Fermanagh.
Cutover raised bog with flooded peat cuttings.
- 15 Lough Head H353329 Co. Fermanagh.
Drain linking two lowland eutrophic lakes.
- 16 Drumgallan Bog H304799 Co. Tyrone.
Cutover raised bog with flooded peat cuttings.
- 17 Black Lough H6381 Co. Tyrone.
Lake and poor fen.
- 18 Cornagogue Lough H474303 Co. Fermanagh.
Lowland eutrophic lake.
- 19 Black Lough H484407 Co. Fermanagh.
Small mesotrophic lake and floating poor fen in afforested blanket bog.
- 20 Cromaghy Lough fen H5130 Co. Fermanagh.
Fen with pools on cutover raised bog.
- 21 Bolusty Beg H052569 Co. Fermanagh.
Cutover raised bog with flooded peat cuttings.
- 22 Mill Race, Wellbrook H752792 Co. Tyrone.
Mill race with beds of water crowfoot.
- 23 Lough Slane H337258 Co. Fermanagh.
Fen on dried out lake.
- 24 Cam Lough H667767 Co. Tyrone.
Mesotrophic lake.
- 25 Bleanish Island, Upper L. Erne H353257 Co. Fermanagh.
Shore of large eutrophic lake.
- 26 Umbra River C733358 Co. Londonderry.
Small river close to its mouth with sea.
- 27 Lough Foyle, Coolagh C588235 Co. Londonderry.
Eutrophic artificial brackish pool at edge of sea-lough.
- 28 Correl Glen H095542 Co. Fermanagh.
Flushes, peaty pools in wet heath.

- 29 Ballycam J523348 Co. Down.
Eutrophic lowland fen.
- 30 Belshaw's Quarry J229671 Co. Antrim.
Small stream in disused chalk quarry.
- 31 Leathemstown Reservoir J2172 Co. Antrim.
Reservoir.
- 32 Parabaun Lough H057572 Co. Fermanagh.
Upland mesotrophic lake in afforested heath.
- 33 Slievenacloy, stream J2571 Co. Antrim.
Small upland stream.
- 34 Ott Mountain flushes J2827 Co. Down.
Small base-poor flushes in upland acid grassland.
- 35 Sillees River H085543 Co. Fermanagh.
Upland river.
- 36 Carnmore Lough H472358 Co. Fermanagh.
Upland lake in heath.
- 37 Derrylea inlet Upper Lough Erne H357287 Co. Fermanagh.
Eutrophic drain through semi-improved grassland.
- 38 Lough Slawn H074560 Co. Fermanagh.
Small peaty lake in upland heath.
- 39 Ballyherly Lough J595525 Co. Down.
Lowland eutrophic lake.
- 40 Lough Sallagh H531438 Co. Tyrone.
Upland peaty lake in blanket bog.
- 41 Lough na Blaney Bane H580474 Co. Tyrone.
Mesotrophic lake.
- 42 Kathleen's Lough C931121 Co. Londonderry.
Eutrophic lake.
- 43 Loughanalbanagh H540440 Co. Tyrone.
Upland lake in blanket bog.

Bull. Ir. biogeog. Soc. No. 22

- 44 Craigavon North Lake J057580 Co. Armagh.
Large artificial lake c30 years old.
- 45 Loughnashade H852455 Co. Armagh.
Fen and small lake.
- 46 Sillees River tributary H087525 Co. Fermanagh.
Small base-rich stream.
- 47 Straduff Quarry H343667 Co. Tyrone.
Shallow pool in disused quarry.
- 48 Helen's Tower fen J486778 Co. Down.
Fen.
- 49 Lough Doo H037505 Co. Fermanagh.
Upland mesotrophic lake.
- 50 Ballynagilly, Wolf's Hill H736857 Co. Tyrone
Small pools in blanket bog.
- 51 Ballymacombs H9998 Co. Londonderry.
Cutover raised bog.
- 52 Cushier River J032512 Co. Armagh.
Lowland eutrophic river.
- 53 Maghery Canal H924637 Co. Armagh.
Canal linking river to eutrophic lake.
- 54 Lough Naman bog H0254 Co. Fermanagh.
Blanket bog.
- 55 Upper Lough Erne, Lady Craigavon Bridge H332279 Co. Fermanagh.
Shore of large eutrophic lake.
- 56 Lough Fad D255195 Co. Antrim.
Upland lake in heath blanket bog.
- 57 Loughisland D253198 Co. Antrim.
Upland lake.
- 58 Pollan Burn D251195 Co. Antrim.
Upland river through blanket bog.

Bull. Ir. biogeog. Soc. No. 22

- 59 Ballagh Lough H500500 Co. Tyrone.
Lowland eutrophic lake.
- 60 limb of Ross Lough H129459 Co. Fermanagh.
Lowland eutrophic lake.
- 61 Tullylammy bog H207564 Co. Fermanagh.
Cutover raised bog.
- 62 Mill Lough H7488 Co. Tyrone.
Small peaty lake in blanket bog.
- 63 Fairy Water H304799 Co. Tyrone.
River.
- 64 Lough Leen H137544 Co. Fermanagh.
Eutrophic lowland lake.
- 65 Tullyavy/Drumcullion Bog H242510 Co. Fermanagh.
Cutover lowland raised bog with flooded peat cuttings.
- 66 Annaghcloughan Bog H571551 Co. Tyrone.
Cutover lowland raised bog with flooded peat cuttings.
- 67 Murrins H568787 Co. Tyrone.
Upland lake.
- 68 Ballintempo Forest H075435 Co. Fermanagh.
Fire pond at edge of conifer forest.
- 69 Lough Namanfin H0545 Co. Fermanagh.
Mesotrophic lake with sandy bed.
- 70 Braade H044548 Co. Fermanagh.
Small pool in relict area of blanket bog.
- 71 Cladagh River H127356 Co. Fermanagh.
Intact lowland river with stony bed.
- 72 Tullywannia Lough H044508 Co. Fermanagh.
Mesotrophic lake.
- 73 Lough Scolban H005612 Co. Fermanagh.
Large mesotrophic lake.

Bull. Ir. biogeog. Soc. No. 22

- 74 Polasumera River H145311 Co. Fermanagh.
Upland river through blanket bog.
- 75 Lough Nagor H1441 Co. Fermanagh.
Upland lake in heath with floating fen.
- 76 Tattenamona Bog H187352 Co. Fermanagh.
Cutover raised bog.
- 77 Meenameen Lough H0255 Co. Fermanagh.
Upland mesotrophic lake with fen.
- 78 Inisherk, Upper Lough Erne H358244 Co. Fermanagh.
Shore of large eutrophic lake.
- 79 Lough Neagh Ballyronan Marina H948858 Co. Londonderry.
Shore of large eutrophic lake.
- 80 Lough Skale H309440 Co. Fermanagh.
Small lake with open fen.
- 81 Lough Mulshane H320509 Co. Fermanagh/Co. Tyrone.
Shallow peaty lake in rleict are of blanket bog.
- 82 Dernish Island, Upper Lough Erne H346261 Co. Fermanagh.
Shore of large eutrophic lake.
- 83 Tonnagh Bog H112521 Co. Fermanagh.
Cutover raised bog.
- 84 Moyrourkan Lough H985426 Co. Armagh.
Fen and small lake.
- 85 Outlack Bog H907399 Co. Armagh.
Inter-drumlin fen.
- 86 Cashel Lough Upper H967198 Co. Armagh.
Lake and cutover bog with fen.
- 87 Cargan Water D170180 Co. Antrim.
Upland river.
- 88 Inver River mire D225183 Co. Antrim.
Flushed blanket bog.

- 89 Castle Enigan fen J1231 Co. Down.
Fen on old cutover bog.
- 90 White Hill fen J252729 Co. Down.
Inter drumlin fen.
- 91 Drumire Fen J020431 Co. Down.
Inter-drumlin fen.
- 92 Loughareema D206357 Co. Antrim.
Watershed mire.
- 93 East Light pool 3, Rathlin D158521 Co. Antrim.
Pool in maritime heath.
- 94 Granemoor Bog H883330 Co. Armagh.
Cutover raised bog.
- 95 Lemnalary Mtn, Garron Plateau D248194 Co. Antrim.
Pool in blanket bog.
- 96 Upper Glenariff Mountain West, unnamed lake D225196 Co. Antrim.
Upland oligotrophic lake.
- 97 Drumbee Bog H911434 Co. Armagh.
Cutover bog and fen.
- 98 Lagan Fen H823335 Co. Armagh.
Drained cutover fen.
- 99 Derryadd Lough south end H9160 Co. Armagh.
Poor fen and shallow peaty lake.
- 100 Conogher Bridge, River Bush C962305 Co. Antrim.
Deep river with modified, eroding banks.
- 101 Collin Glen J265726 Co. Antrim.
River and dammed pond.
- 102 Lough Gullion bog J005625 Co. Armagh.
Flooded peat cuttings in relict lowland raised bog.
- 103 Turmoyra Marsh J056605 Co. Armagh.
Eutrophic peaty drains.

Bull. Ir. biogeog. Soc. No. 22

- 104 Deer's Meadow, Spelga J277255 Co. Down.
Flushed upland wet heath.
- 105 Leitrim Lodge J2225 Co. Down.
Flushed wet heath.
- 106 Yellow water river J2222 Co. Down.
Upland river.
- 107 River Dun, Glendun D2132 Co. Antrim.
Fast-flowing river.
- 108 Sallagh Braes D3305 Co. Antrim.
Peat pools in blanket bog.
- 109 Glynn J410995 Co. Antrim.
Brackish artificial lagoon.
- 110 Trassey River valley J3030 Co. Down.
Flushed wet heath.
- 111 Ess Bridge D175400 Co. Antrim.
Fast-flowing stream with eroding bank.
- 112 Interlaken J398649 Co. Down.
Lowland eutrophic lake.
- 113 Mountnab, fen near H944410 Co. Antrim.
Inter-drumlin fen.
- 114 The Isles, Dunloy D037195 Co. Antrim.
Drainage ditch along edge of raised bog.
- 115 Struell Wells J513441 Co. Down.
Fen and stream.
- 116 Loughnabrick D258199 Co. Antrim.
Upland lake.
- 117 Pool system, Cuilcagh H140297 Co. Fermanagh.
Natural pools in upland blanket bog.
- 118 Lower Lough Macnean H124384 Co. Fermanagh.
Shore of large eutrophic lake.

Bull. Ir. biogeog. Soc. No. 22

- 119 Five Points Bog H199380 Co. Fermanagh.
Cutover lowland raised bog.
- 120 Carran Lough H139477 Co. Fermanagh.
Grazed shoreline of eutrophic lake.
- 121 Derryhennet fen H823361 Co. Armagh.
Inter-drumlin fen.
- 122 Green Lough H177507 Co. Fermanagh.
Turlough.
- 123 Breen Bridge/Breen fen D1234 Co. Antrim.
Drained tussocky fen.
- 124 Lower Lough Erne, Trory H225482 Co. Fermanagh.
Shore of large eutrophic lake.
- 125 Corracash Lough H256341 Co. Fermanagh.
Lowland eutrophic lake.
- 126 Upper Lough Erne Drumree. & Slee Td H2936 Co. Fermanagh.
Shore of large eutrophic lake.
- 127 Lough Coole H255435 Co. Fermanagh.
Lowland eutrophic lake.
- 128 Crockanaver H226635 Co. Fermanagh.
Flooded limestone quarry.
- 129 Lough Doo H202741 Co. Tyrone.
Mesotrophic lake in degraded bog.
- 130 Friar's Lough H368268 Co. Fermanagh.
Lowland eutrophic lake.
- 131 Moorlough H386303 Co. Fermanagh.
Large lowland eutrophic lake.
- 132 Lough Napeasta H395366 Co. Fermanagh.
Mesotrophic lake in conifer plantation.
- 133 Loughnabrick pool D263199 Co. Antrim.
Small pool with poor fen in blanket bog.

Bull. Ir. biogeog. Soc. No. 22

- 134 Lough Cushkeery H487399 Co. Fermanagh.
Upland mesotrophic lake with open poor fen.
- 135 Corranny Lough H477332 Co. Fermanagh.
Lake and open fen.
- 136 Cromaghy Lough H5130 Co. Fermanagh.
Eutrophic lake.
- 137 Inver Lough H520312 Co. Fermanagh.
Eutrophic lake.
- 138 Clare Glen J020445 Co. Armagh.
Stony river in wooded valley.
- 139 Killyvilly Lough H5533 Co. Fermanagh.
Lake and degraded fen.
- 140 Stone Hill sandpit H7489 Co. Tyrone.
Shallow pond in disused sand workings.
- 141 Temple Water, Castle Ward J574503 Co. Down.
Artificial lake on estate.
- 142 Mullaghbane West H990168 Co. Armagh.
Fen on cutover bog.
- 143 Lake nr Big Trosk D266201 Co. Antrim.
Upland lake.
- 144 R. Blackwater, Benburb H812521 Co. Tyrone.
Lowland river just downstream of shallow gorge.
- 145 Cumran House fen, Clough J407406 Co. Down.
Inter-drumlin fen.
- 146 Burren Lough J319523 Co. Down.
Lowland eutrophic lake and fen.
- 147 Lough Neagh, Maghery H927635 Co. Armagh.
Sheltered shore of large eutrophic lake.
- 148 Corbet Fen J180465 Co. Down.
Lowland fen.

- 149 Scarva Lough J060440 Co. Armagh.
Lowland eutrophic lake.
- 150 Magheralagan Lake J443432 Co. Down.
Lowland eutrophic lake.
- 151 Lough Money fen J538459 Co. Down.
Enriched and grazed fen and *Cladium* swamp.
- 152 Closet River J048613 Co. Armagh.
Lowland eutrophic river.
- 153 Shankys River J224255 Co. Down.
Small upland stream.
- 154 Bloody Bridge valley J389269 Co. Down.
Flushed wet heath in steep valley.
- 155 Mountain Lake, Castlewellan J328375 Co. Down.
Small lake in clearing in conifer forest.
- 156 Lagoon, Dundrum Inner Bay J418392 Co. Down.
Artificial brackish pond.
- 157 Turmennan J4850 Co. Down.
Mesotrophic fen and shallow pools in narrow valley.
- 158 Loughkeelan J563453 Co. Down.
Eutrophic lake and fen.
- 159 Mallard Pond, Castleward J555490 Co. Down.
Eutrophic pond.
- 160 Keenaghan Lough G980600 Co. Fermanagh.
Lake and stream.
- 161 Shean Lough H067565 Co. Fermanagh.
Small mesotrophic lake in upland heath.
- 162 Strangford Lough, north shore J489709 Co. Down.
Brackish ditch.
- 163 Lough Akista H042502 Co. Fermanagh.
Upland lake in heath.

Bull. Ir. biogeog. Soc. No. 22

- 164 Upper Lough Erne, Knockninny H280314 Co. Fermanagh.
Sheltered shore of large eutrophic lake with rich fen.
- 165 Upper Lough Erne, Inishcreenry H297334 Co. Fermanagh.
Shore of large eutrophic lake with rich fen.
- 166 Mill Lough H244384 Co. Fermanagh.
Large eutrophic lake and fen.
- 167 River Derg at Castlederg H2684 Co. Tyrone.
Riffly section of river.
- 168 Traad Point Ponds H954874 Co. Londonderry.
Mature artificial flooded sand pits.
- 169 "Green Bottoms", Crom H363246 Co. Fermanagh.
Artificial peaty pool in area of rich fen.
- 170 Mill Bay, Carlingford Lough J256132 Co. Down.
Saltmarsh pools.
- 171 Ballynahone Bog H860980 Co. Londonderry.
Large intact raised bog with poor fen.
- 172 Summerhill Lough H491281 Co. Fermanagh.
Marl lake with fen.
- 173 Kilmacbrack Lough H407296 Co. Fermanagh.
Lowland eutrophic lake.
- 174 Ballyquintin J626466 Co. Down.
Rock pools.
- 175 Killymackan Lough H3220 Co. Fermanagh.
Large eutrophic lake with relict area of mossy fen.
- 176 Slieve Binnian J3224 Co. Down.
Flushes in upland heath.
- 177 Lough Moss J237516 Co. Down.
Lowland fen.
- 178 Ballymacormick Point J5283 Co. Down.
Seepages and small stream on rocky coastal headland.

Bull. Ir. biogeog. Soc. No. 22

- 179 Ballytrustan Fen J538436 Co. Down.
Inter-drumlin fen.
- 180 Lough Natrosk D273198 Co. Antrim.
Large upland lake.
- 181 Dunmore Fen and Black Lough J358451 Co. Down.
Mesotrophic ponds, shallow peaty pools and large area of poor fen.
- 182 Sydenham pools J3877 Co. Down.
Brackish pools on reclaimed upper estuary.
- 183 Victoria Park Lake J367754 Co. Down.
Artificial brackish lagoon.
- 184 Lough Money J532452 Co. Down.
Natural lake used as reservoir.
- 185 Glastry Clay Pits J638630 Co. Down.
Deep flooded clay pits.
- 186 Carrowcarlin J560496 Co. Down.
Over grown rich fen.
- 187 Donnybrewer Level C520234 Co. Londonderry.
Brackish drain around polder.
- 188 Ballymacashen J467603 Co. Down.
Lowland fen.
- 189 Anne's Point, Strangford Lough J559686 Co. Down.
Brackish pools.
- 190 Monawilkin Lough H085530 Co. Fermanagh.
Mesotrophic lake and fen.
- 191 Legalough H088345 Co. Fermanagh.
Sheltered lake and fen in limestone hills.
- 192 Lough A Waddy H041648 Co. Fermanagh.
Upland exposed lake in blanket bog.
- 193 Lough Atona H110292 Co. Fermanagh.
Upland oligotrophic lake.

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- 194 Black Lough H763609 Co. Tyrone.
Mesotrophic lake.
- 195 Teal Lough H730880 Co. Tyrone.
Upland raised bog and small lake.
- 196 Lough Neagh Blacker's Rock H9472 Co. Tyrone.
Sheltered shore of large eutrophic lake with fen.
- 197 Bloody Bridge Coastal pools J390269 Co. Down.
Small pools on rocky shore above splash zone.
- 198 Raw Lough H251618 Co. Fermanagh.
Mesotrophic lake with floating scraw.
- 199 Watson's Lough H307495 Co. Fermanagh.
Lake and fen.
- 200 Aughnagurgan Lough H873311 Co. Armagh.
Lake and fen.
- 201 Peatlands Country Park H890604 Co. Armagh.
Large cutover raised bog.
- 202 Big Bog J1950 Co. Down.
Lowland fen.
- 203 Clea Lakes J505548 Co. Down.
Eutrophic lake and fen.
- 204 Derryvore, Portadown J017567 Co. Armagh.
Eutrophic fen.
- 205 Greenan Lough J119233 Co. Down.
Lake and fen.
- 206 Lough Neagh, Rea's Wood J143855 Co. Antrim.
Sandy shore of large eutrophic lake.
- 207 Rea's Wood, pond J140853 Co. Antrim.
Eutrophic artificial pond.
- 208 Garvaghy (Gall) Bog J214487 Co. Down.
Eutrophic fen.

Bull. Ir. biogeog. Soc. No. 22

- 209 Lough Aghery, Dromore J293538 Co. Down.
Large eutrophic lake with mossy fen.
- 210 Ballynoe Fen J480396 Co. Down.
Interdrumlin fen.
- 211 Quoile Pondage J4974, J5048 Co. Down.
Artificially impounded estuary.
- 212 Aughnadarragh Lough J443595 Co. Down.
Lake and fen.
- 213 The Umbra C7235 Co. Londonderry.
Dune slack.
- 214 Tullyvocady Lough H060647 Co. Fermanagh.
Mesotrophic lake in partially afforested heath.
- 215 Trannish Island, Upper Lough Erne H322294 Co. Fermanagh.
Open stony shore of large eutrophic lake.
- 216 Lough Doo H3429 Co. Fermanagh.
Lowland eutrophic lake with dense *Phragmites* swamp.
- 217 Knockballymore Lough H475267 Co. Fermanagh.
Marl lake with relict mossy fen.
- 218 Derry Hill fen J437448 Co. Down.
Inter-drumlin fen.
- 219 Garry Bog C940290 Co. Antrim.
Lowland raised bog.
- 220 Edenknappagh H923419 Co. Armagh.
Eutrophic pond.
- 221 Newry Canal, Moneypenny's J031513 Co. Armagh.
Disused 200yr old canal.
- 222 Skillyscolban Lough J187498 Co. Down.
Small lake and fen.
- 223 Blue Lough J306275 Co. Down.
Upland lake.

Bull. Ir. biogeog. Soc. No. 22

- 224 Camagh Bay, Lower Lough Erne H160517 Co. Fermanagh.
Sheltered shore of large eutrophic lake.
- 225 Drummully Lough H3028 Co. Fermanagh.
Lowland eutrophic lake.
- 226 Lough Narye H396339 Co. Fermanagh.
Lake and open swamp.
- 227 Drumawhy J547756 Co. Down.
Relict cutover raised bog.
- 228 Burdautien Lough H4928 Co. Fermanagh.
Marl lake with relict birch covered cutover bog with flooded peat cuttings.
- 229 Drumacrittin Lough H5432 Co. Fermanagh.
Lake and floating mossy fen.
- 230 Selshion Moss H985545 Co. Armagh.
Poor fen on cutover lowland raised bog.
- 231 Drumvale J300678 Co. Down.
Eutrophic pond and ditch.
- 232 Tullyframe Sandpit J262169 Co. Down.
Shallow pool in sandpit.
- 233 Ballykine Loughs J356537 Co. Down.
Lowland eutrophic lake.
- 234 Strand Lough J535374 Co. Down.
Brackish lagoon and inflowing stream.
- 235 Crossgar, Cuttyshane J485526 Co. Down.
Relict cutover raised bog with flooded peat cuttings.
- 236 Lough Alaban H070438 Co. Fermanagh.
Mesotrophic lake in partially afforested blanket bog.
- 237 Upper L Erne, S shore Galloon Island H3821 Co. Fermanagh.
Grazed fen and swamp on large eutrophic lake.
- 238 Claraghmore Lough H356761 Co. Tyrone.
Mesotrophic lake.

Bull. Ir. biogeog. Soc. No. 22

- 239 Lough Fadden D187420 Co. Antrim.
Mesotrophic lake with floating poor fen.
- 240 Derrylard Clay pit H957615 Co. Armagh.
Flooded disused clay pit.
- 241 Lough Brickland J111411 Co. Down.
Eutrophic lake.
- 242 Heron and Carrigullian Lough J5089 Co. Down.
Eutrophic lake with large fen.
- 243 Curran Bog H8795 Co. Londonderry.
Large cutover raised bog with many flooded peat cuttings.
- 244 Kinnego Pond, Oxford Island J061612 Co. Armagh.
Artificial eutrophic lake.
- 245 Kilbroney Red Bog J215216 Co. Down.
Shallowly flooded cutover upland blanket bog.
- 246 Lackan Bog J237375 Co. Down.
Cutover raised bog with poor fen and flooded peat cuttings.
- 247 Kilroosky Lough H4927 Co. Fermanagh.
Marl lake with floating mossy fen.
- 248 Lough Martincrossagh H0542 Co. Fermanagh.
Mesotrophic lake in afforested heath.
- 249 Bannagh R. mouth, Lower Lough Erne H137651 Co. Fermanagh.
Shore of large eutrophic lake with open *Phragmites* swamp.
- 250 Edenslate J605652 Co. Down.
Fen on cutover bog.
- 251 Altnadua Lough J3134 Co. Down.
Lake and fen.
- 252 Drumcarn fen (Drumnahavil) H813285 Co. Armagh.
Flooded peat cuttings with fen and swamp in wet heath.
- 253 Brackagh Moss J020510 Co. Armagh.
Extensive fen and relict cutover raised bog.

Bull. Ir. biogeog. Soc. No. 22

- 254 Derryleckagh J117253 Co. Down.
Fen and transition mire.
- 255 Upper Lough Erne Corradovar Td. H3029 Co. Fermanagh.
Sheltered shore of large eutrophic lake with rich fen.
- 256 Greyabbey J582675 Co. Down.
Coastal lagoon.
- 257 Montiaghs Moss J093654 Co. Antrim.
Extensive lowland cutover bog with numerous flooded peat cuttings.
- 258 River Erne, Belleek G942588 Co. Fermanagh.
Eutrophic river.
- 259 Helens Tower pond J484775 Co. Down.
Pool and fen.
- 260 Hillsborough Park Lake J245585 Co. Down.
Lake in conifer woodland.
- 261 Horse Island, Strangford Lough J5960 Co. Down.
Brackish pools in saltmarsh.
- 262 Fardrum Lough H181501 Co. Fermanagh.
Shallow lake with fluctuating water levels.
- 263 Arney River at Drumane Bridge H235365 Co. Fermanagh.
Lowland eutrophic river with modified banks.
- 264 Cleenish, Upper Lough Erne H255385 Co. Fermanagh.
Shore of large eutrophic lake.
- 265 Kilclief Point J599460 Co. Down.
Small brackish pools in saltmarsh.
- 266 Stream near Ballykeel J327165 Co. Down.
Small lowland stream.
- 267 Rowantree Moss J177513 Co. Down.
Fen on relict cutover bog.
- 268 Black Lough H711539 Co. Tyrone.
Mesotrophic lake with large floating poor fen.

Bull. Ir. biogeog. Soc. No. 22

- 269 Cleenish Island Loughs H260392 Co. Fermanagh.
Eutrophic lowland lakes.
- 270 Crab Lough C927117 Co. Londonderry.
Small lake with floating poor fen.
- 271 Cullentra Lough H474474 Co. Tyrone.
Mesotrophic lake with extensive floating fen.
- 272 Lough McCall H540482 Co. Tyrone.
Small mesotrophic lake with surrounding poor fen.
- 273 Maghera Lough H310557 Co. Tyrone.
Large inter-drumlin lake with small spring-fed floating fen.
- 274 Lough Patrick H5068 Co. Tyrone.
Lake basin with floating poor fen and little open water in relict area of bog.
- 275 Ballard J024230 Co. Armagh.
Peaty pools and poor fen.
- 276 Ballybannan J371357 Co. Down.
Peaty pools and fen along narrow stream.
- 277 Ballynagross Lower fen J537438 Co. Down.
Eutrophic lowland fen.
- 278 Clonalig Lough H900121 Co. Armagh.
Lake with adjoining fen on cutover bog.
- 279 Corbally fen J451382 Co. Down.
Mossy fen and deep clear pools.
- 280 Drumlougher fen H896185 Co. Armagh.
Mossy fen on cutover bog.
- 281 Drumnamether fen H990436 Co. Armagh.
Eutrophic fen and peaty pools.
- 282 Kiltubbrid Loughs H769395 Co. Armagh.
Calcareous mossy fen.
- 283 Loughaveely H954141 Co. Armagh.
Small lake with extensive poor-fen.

Bull. Ir. biogeog. Soc. No. 22

- 284 Lurgan Lough Upper H951156 Co. Armagh.
Small lake with extensive poor-fen.
- 285 Brackly Lough H821309 Co. Armagh.
Mesotrophic lake with floating scraw.
- 286 Foughil Etra fen J055913 Co. Armagh.
Mossy fen.
- 287 Mew Island J604683 Co. Down.
Freshwater pool on offshore island.
- 288 Portnacooly mire D146522 Co. Antrim.
Mossy poor fen around small stream.
- 289 Loughaltachuile D143522 Co. Antrim.
Small mesotrophic lake in wet heath.
- 290 Lough Vearty G9956 Co. Fermanagh.
Sandy exposed lake shore.
- 291 Ballyconagan pond 1 D145518 Co. Antrim.
Small pool in heath.
- 292 Articlave Burn, Ardina Bridge C789349 Co. Londonderry.
Oligotrophic stream.
- 293 Agivey River, Bovagh Bridge C884194 Co. Londonderry.
River,
- 294 Macosquin River, Crossgare Bridge C843272 Co. Londonderry.
River.
- 295 Greenshields River, Ballyboylands Br. C985267 Co. Antrim.
Eutrophic river.
- 296 River Bush, Senierl Bridge C932360 Co. Antrim.
Mesotrophic river.
- 297 River Bush, Magherahoney Bridge D077290 Co. Antrim.
Mesotrophic river.
- 298 River Bush, Crockarover Bridge D101253 Co. Antrim.
Mesotrophic river.

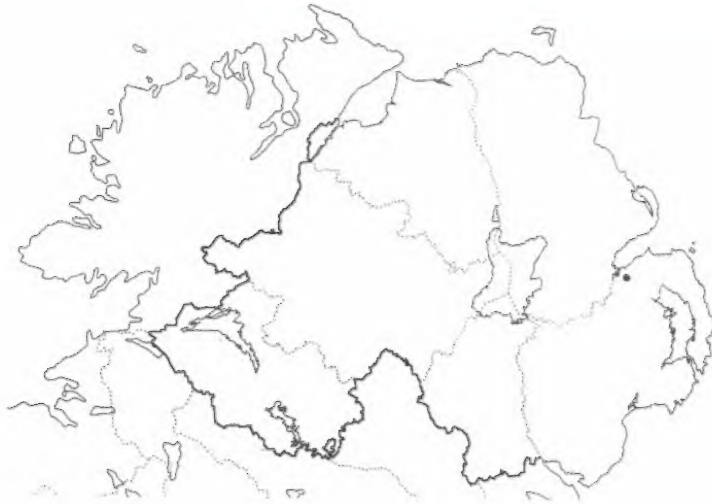
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- 299 River Bush, Langfield Bridge D044319 Co. Antrim.
Mesotrophic river.
- 300 Owenkillew River, Glenlark bridge H575875 Co. Tyrone.
Upland river.
- 301 Inver Burn, Breen Bridge D117342 Co. Antrim.
Upland river.
- 302 Murder Hole Burn C747288 Co. Londonderry.
Upland stream.
- 303 Ladyhill Burn J183912 Co. Antrim.
Stream with marl deposits.
- 304 Moyola River, Curran Bridge H892955 Co. Londonderry.
River with sandy banks.
- 305 Moyola River, New Bridge H956906 Co. Londonderry.
Mesotrophic river.
- 306 Moyola River, Forge Bridge H813975 Co. Londonderry.
Mesotrophic river.
- 307 Crossbane Lough H800299 Co. Armagh.
Lake with sparse *Carex rostrata* swamp.
- 308 Bog Meadows J315725 Co. Antrim.
Relict fen with drains.
- 309 Cooneen Water, Grogey Bridge H448428 Co. Fermanagh.
Stony river.
- 310 Stormont Estate J3974 Co. Down.
Small mesotrophic stream.
- 311 Linford Water D3108 Co. Antrim.
Upland stream.
- 312 Dundrum Inner Bay J404355 Co. Down
Saltmarsh pool.
- 313 Bann Estuary C795360 Co. Londonderry.
Tidal stretch of river.

FIGURES 1-2: distribution maps of *Hydraena britteni* and *H. gracilis*.



FIGURES 3-4: distribution maps of *Hydraena nigrita* and *H. riparia*.



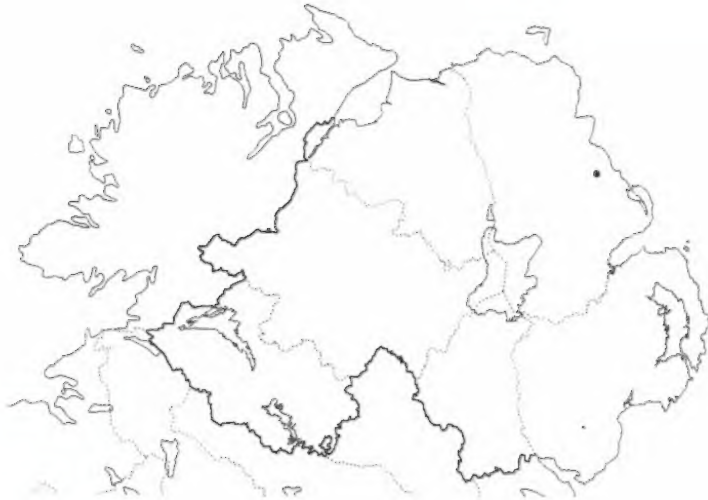
FIGURES 5-6: distribution maps of *Limnebius truncatellus* and *Ochthebius auriculatus*.



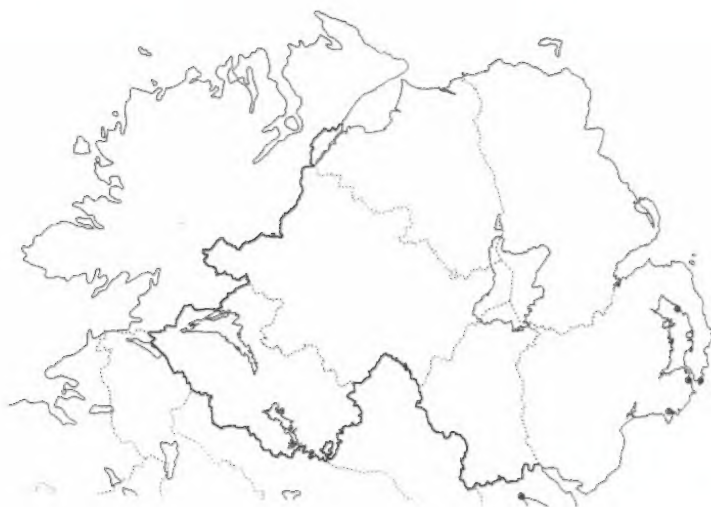
FIGURES 7-8: distribution maps of *Ochthebius bicolon* and *O. dilatatus*.



FIGURES 9-10: distribution maps of *Ochthebius exsculptus* and *O. lejolisi*.



FIGURES 11-12: distribution maps of *Ochthebius marinus* and *O. minimus*.



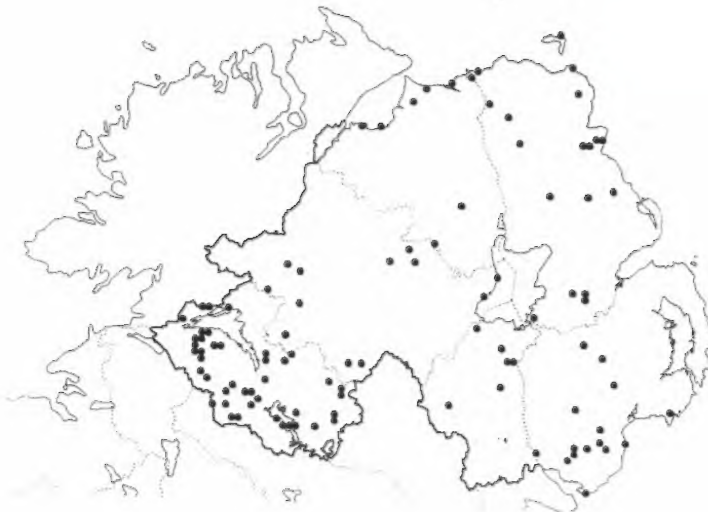
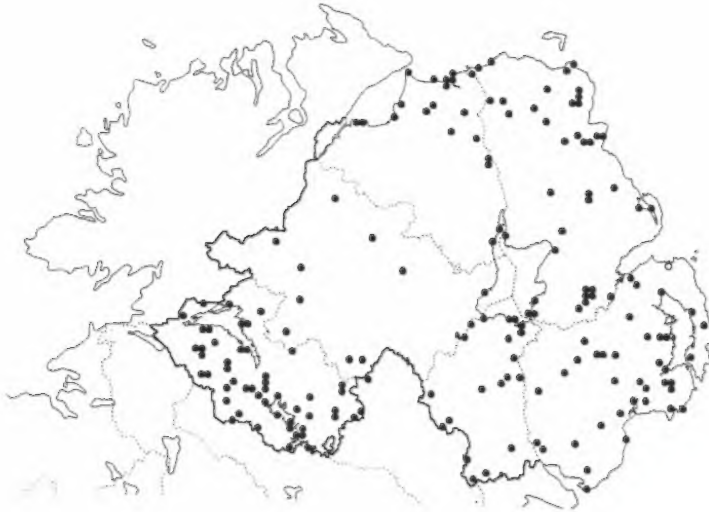
FIGURES 13-14: distribution maps of *Ochthebius punctatus* and *O. viridis*.



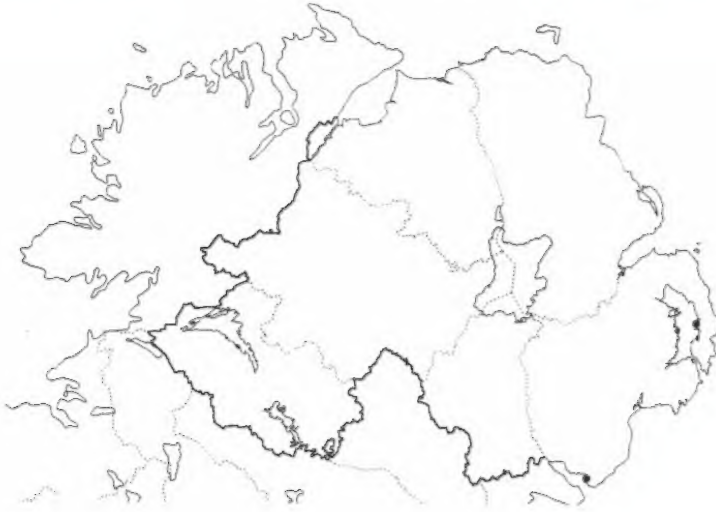
FIGURES 15-16: distribution maps of *Helophorus aequalis* and *H. arvernensis*.



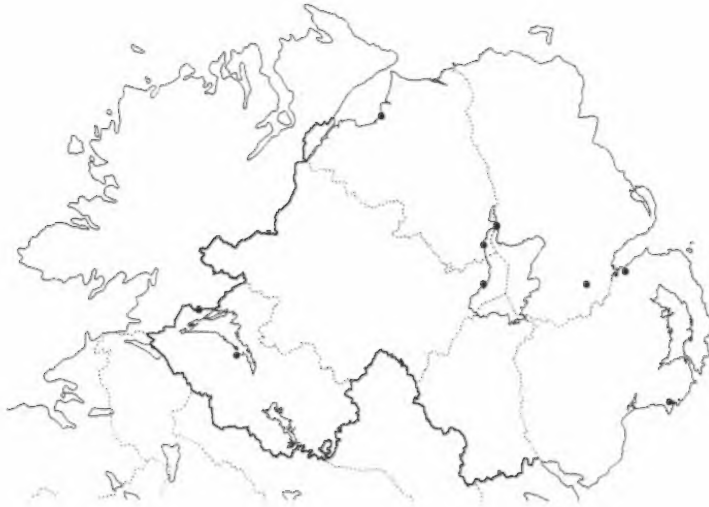
FIGURES 17-18: distribution maps of *Helophorus brevipalpis* and *H. flavipes*.



FIGURES 19-20: distribution maps of *Helophorus fulgidicollis* and *H. grandis*.



FIGURES 21-22: distribution maps of *Helophorus minutus* and *H. obscurus*.



FIGURES 23-24: distribution maps of *Hydrochus brevis* and *H. ignicollis*.



FIGURES 25-26: distribution maps of *Coelostoma orbiculare* and *Cercyon convexiusculus*.



FIGURES 27-28: distribution maps of *Cercyon marinus* and *C. tristis*.



FIGURES 29-30: distribution maps of *Cercyon ustulatus* and *Paracymus scutellaris*.



FIGURES 31-32: distribution maps of *Hydrobius fuscipes* and *Anacaena globulus*.



FIGURES 33-34: distribution maps of *Anacaena limbata* and *A. lutescens*.



FIGURES 35-36: distribution maps of *Laccobius atratus* and *L. atrocephalus*.



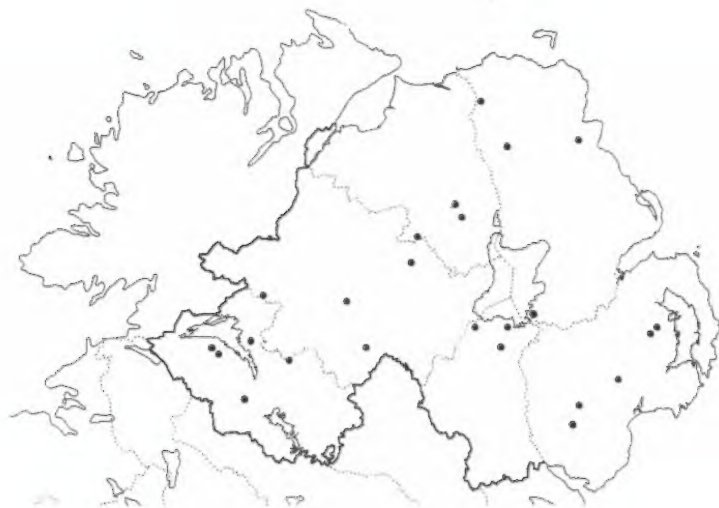
FIGURES 37-38: distribution maps of *Laccobius biguttatus* and *L. bipunctatus*.



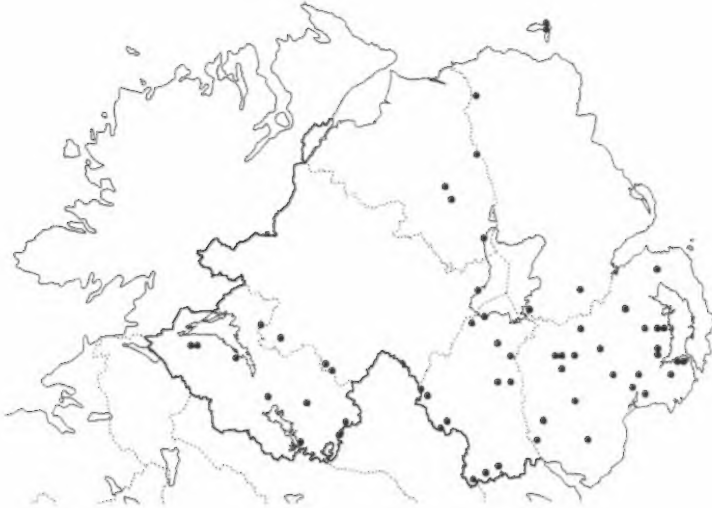
FIGURES 39-40: distribution maps of *Laccobius minutus* and *Laccobius striatulus*.



FIGURES 41-42: distribution maps of *Enochrus affinis* and *E. bicolor*.



FIGURES 43-44: distribution maps of *Enochrus coarctatus* and *E. fuscipennis*.



FIGURES 45-46: distribution maps of *Enochrus ochropterus* and *E. testaceus*.



FIGURES 47-48: distribution maps of *Cymbiodyta marginella* and *Chaetarthia seminulum*.



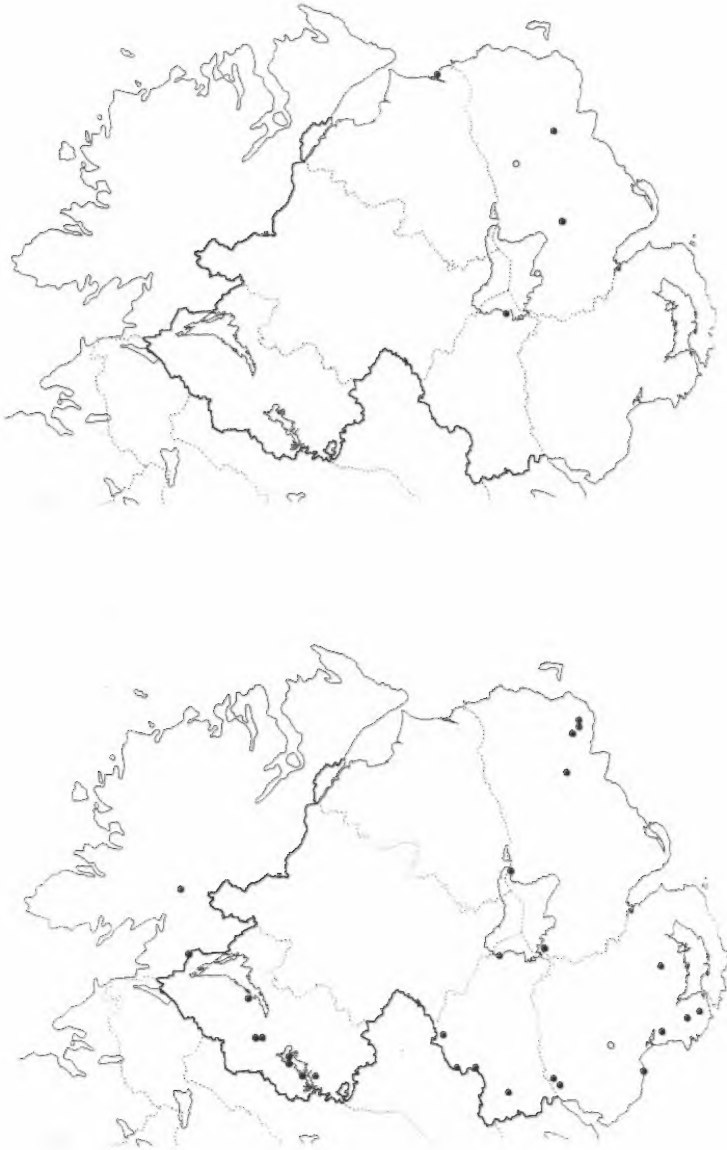
FIGURES 49-50: distribution maps of *Elmis aenea* and *Esolus parallelepipedus*.



FIGURES 51-52: distribution maps of *Limnius volckmari* and *Oulimnius tuberculatus*.



FIGURES 53-54: distribution maps of *Dryops ernesti* and *Dryops luridus*.



Bull. Ir. biogeog. Soc. 22 (1998)

A CHECKLIST OF THE SIPHONOSTOMATOIDA (CRUSTACEA: COPEPODA) OF IRELAND

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The Siphonostomatoida constitutes an Order of the Subclass Copepoda. The animals occur in marine, brackish, and freshwater habitats, and are usually found in some sort of association with other animals. They come in a variety of shapes and sizes, but they are united in having similar mouthparts. These structures are modified and formed into a sucking tube or siphon, hence the name.

Ecologically, they can be divided conveniently into two groups; the invertebrate associates, and the fish parasites. The invertebrate associates range from relatively unmodified cyclopiform species which probably have a loose association with their hosts, to much-modified and apparently degenerate forms which are undoubted parasites. They are found with a variety of invertebrate groups, including sponges, coelenterates, polychaetes, echinoderms and tunicates. Some, the nicthoids, are egg-mimics and live in the brood pouches of peracarid crustaceans or with decapod crustaceans (Gotto, 1979). Others, such as the Rataniidae, lead a wholly pelagic life (Boxshall, 1979). These are possibly not truly planktonic, but may be associated with larger planktonic organisms. For many of the species, the precise nature of any association and the appropriate host is unknown.

The fish parasites are large copepods and, like the invertebrate associates, also vary from being relatively unmodified and mobile ectoparasites to being extreme degenerate forms firmly anchored to their hosts. Many are of economic importance.

This paper is an attempt to gather together a comprehensive annotated check-list of the siphonostome copepods of Ireland. It is based primarily on a re-assessment of the published records in the scientific literature, augmented by some new data. The last complete check-list was by Pearson (1905), who listed 30 species which would belong to the present order, and a new list is now appropriate. There have been many studies done since Pearson, and a significant number of species added to the Irish fauna (e.g., Gotto, 1966; O'Riordan, 1966a,

1966b).

The species list is laid out in much the same format as in similar lists of the harpacticoid (Holmes and O'Connor, 1990) and poecilostomatoid copepods (Holmes and Gotto, 1992) of Ireland. The genera and species are listed in alphabetical order within families. Synonyms which appear in the Irish literature are given under the relevant modern names. Where a species has been recorded in the literature under a name which is not a synonym, i.e., misidentified, the original name is included for reference purposes. Material lodged in the National Museum of Ireland is indicated NMI. For each species, the records are listed county by county in alphabetical order. Offshore records or records where the county is in doubt are categorised as 'Ireland'. For each county, the records are listed in order of date with the published records first and then the new unpublished data. For the published material, usually only the original record is cited, as some papers repeat previous data. Material collected by the author is indicated by the abbreviation 'JMCH'.

The old records of William Thompson (1844, 1847, 1856) and Baird (1850) are difficult to interpret. Thompson, with characteristic generosity, passed his material on to Professor Baird, who published the distributional records in a general way (Baird, 1850). The same data, with more precise localities was later published posthumously in Thompson's (1856) *Natural History of Ireland*. For example, *Lepeophtheirus stromii* Baird from Donaghadee in Thompson (1856) is probably the same as the record from Co. Down in Baird (1850). The identity of the material can be interpreted by reference to the descriptions and illustrations in Baird (1850). Some of the species in Thompson (1856) are unrecognisable, particularly those derived from a J. V. Thompson manuscript. Names like *Entomoda canicula* J. V. Thompson and *Entomoda puella* J. V. Thompson, both from 'S. of Ireland', can not be matched with any present species. The initials for Thompson are included in the list, as there is potential for confusion between William Thompson, J. Vaughan Thompson, and Isaac C. Thompson. This problem is also exemplified by the work of Andrew Scott and Alexander Scott.

For the fish parasites, the precise locality where the copepod was taken is frequently a matter for conjecture. In many cases the only information is where the fish was landed, and localities such as Belfast or Dublin market are mentioned. Records from the Irish Sea (Scott and Scott, 1913) are based on their work in the eastern side of the Irish Sea, and so are not included,

following the guidelines in O'Riordan (1966b). The distribution of parasites may be the same as that of their hosts, but not necessarily so.

Ecological information is kept to a minimum. For each species, data are given, *inter alia*, on whether it is (a) marine, brackish or freshwater; (b) associated with a particular habitat or animal group; (c) attracted to a light-trap (Holmes and O'Connor, 1988). The parasitic nicothoids are often encountered in light-trap samples, but it is the amphipod host which is attracted and not the relatively immobile copepod. Where relevant, a brief discussion on taxonomic problems or other matters follows.

Many of the records mentioned in this paper are from the Lough Hyne Marine Nature Reserve in West Cork. The author has seen the lough referred to in print variously as 'Lough Hyne', 'Lough Hyne (Ine)', 'Loch Aidhean' 'Lough Ine', 'Loch Oighin', 'Loughine', and even 'Lough Hine'. In this list the term 'Lough Hyne' is used throughout.

The present check-list contains 90 species in 22 families. All previous records of Irish siphonostome species, both marine and freshwater, are cited. In addition, there are 141 new records. Thirteen species are new to Ireland. These are indicated by *.

Studies on the Irish fauna are far from complete. Of the 69 siphonostomatoid marine invertebrate associates listed by Gotto (1993) from the European Atlantic seaboard, only 37 (53.6%) appear in the present check-list. Similarly, of the 90 siphonostomatoid fish parasites covered by Kabata (1979) *Parasitic Copepoda of British Fishes*, only 44 (48.9%) appear here. It is hoped therefore that this list will provide a basis for future research.

Checklist of the Irish Siphonostomatoida

Rataniidae

Ratania atlantica Farran, 1926

Mayo: 1♀, Station S.R.197. off Co. Mayo, 54°57'N, 10°51'W., coarse silk tow-net, 500 fathoms, 11 February 1905, Fisheries (NMI); **Ireland:** off west coast of Ireland (Farran, 1926).

Marine, planktonic (Boxshall, 1979). The single ♀ specimen from off Co. Mayo, mounted on a slide and labelled 'Lichomolgid', is part of a collection of material transferred from Fisheries to NMI in 1911. The slide was probably made by G. P. Farran.

Asterocheridae

***Acontiophorus armatus* Brady, 1880**

(= *Ascomyzon ornatum* Brady and Robertson, 1973)

Cork: Barloge Creek, near Lough Hyne (Holmes, 1996); **Down:** 2♂♂ 2juvs, Ringhaddy Sound (J5359), Strangford Lough, 20m, from *Alcyonium digitatum* L. on wreck of the 'Alisdaire', 27 September 1991, I. Lawlor (NMI); **Dublin:** 1♀ 1juv., Dalkey Sound (O2726), from *Alcyonium digitatum*, 8 November 1992, I. Lawlor (NMI); **Wexford:** 1♂ 1♀, Conningbeg Light (X9188), 40m, from *Alcyonium digitatum*, April 1994, D. Minchin (NMI); **Ireland:** 1♀, Station S.R.387. Porcupine Seabight, 51°50'N. 12°14'W., cheesecloth net on trawl, 530 fathoms, 7 November 1906, Fisheries (NMI).

Marine, associated with alcyonacean *Alcyonium digitatum* (Holmes, 1996).

***Acontiophorus scutatus* (Brady and Robertson, 1873)**

(= *Solenostoma scutatum* Brady and Robertson, 1873)

Antrim: Whitehead, and Larne Lough (Pearson, 1905); **Cork:** Lough Hyne (Holmes, 1983); 1♂, the Narrows (W016258), Kinish Harbour, Sherkin Island, 30 June 1980, JMCH; 1♂, Lough Hyne (W100280), sponge on *Chlamys distorta* (da Costa), 5 July 1992, J. Nunn (NMI); several specimens, Lough Hyne (W100282), rock washing, 11 July 1993, JMCH (NMI); 1♀, Lough Hyne (W099283), rock washing, 12 July 1993, JMCH; 2♂♂ 1juv., Lough Hyne (W100283), 19 July 1983; 5♂♂ 6♀♀, Lough Hyne (W100283), sponges, 28 June 1994, JMCH (NMI); **Dublin:** 1♀, Dublin Bay (O2-3-), 3 December 1981, J. G. Wilson (NMI); 2♀♀ 6juvs, Dalkey Sound (O2726), from *Antedon bifida* (Pennant), 8 November 1992, I. Lawlor (NMI); **Galway:** Clifden Bay (Brady and Robertson, 1873; Brady, 1880); Roundstone Bay (Brady, 1880); Ballynakill (Farran, 1913); 1♂, Salt Lake (L6649), Clifden, *Serpula* reef, July 1980, B. O'Connor (NMI); **Galway/Mayo:** 2♀♀, Killary Harbour, *Serpula* reef, 4m, May 1984, D. Minchin (NMI); **Kerry:** 1♀, Ventry (Q3800), 3 June 1989, JMCH (NMI); **Mayo:** Westport Bay (Brady, 1880).

Marine, associated with sponges (Gotto, 1993). A listing from 'east Ireland' in Gotto (1993) is based on the record from Whitehead, Belfast Lough in Pearson (1905), which was in turn based on a manuscript record by Brady (1904).

***Asterocheres boeckii* (Brady, 1880)**

(= *Artotrogus boeckii* Brady, 1880)

Antrim: off Whitehead, and Larne Lough (Pearson, 1905); **Cork:** Lough Hyne (Holmes, 1991); 2♂♂ 4♀♀ 1 juv., Lough Hyne (W100282), sponges, 28 June 1994, JMCH (NMI);

Galway: Roundstone Bay (Brady, 1880); **Mayo:** Westport Bay (Brady and Robertson, 1873, as *A. lilljeborgii* Boeck; Brady, 1880); **Ireland:** off south-west Ireland (Bourne, 1890).

Marine, with sponges *Haliclona oculata* (Pallas), *Halichondria panicea* (Pallas) (Gotto, 1993).

***Asterocheres latus* (Brady, 1880)**

(= *Cyclopicera lata* Brady, 1880)

Cork: Lough Hyne (Holmes, 1983); numerous specimens, Lough Hyne (W0928), light-traps, 1984-1997, JMCH (NMI); **Donegal:** Lough Swilly (Brady, 1880); several specimens, Caffard Bay (C1741), Mulroy Bay, 6m, 5 September 1980, D. Minchin (NMI); **Galway:** 5 specimens on slides, labelled *Artotrogus boeckii*, Station M.L.V (or Station CXV, Ballynakill), Fahy Bay (L6658), 1-2 fathoms, 17 January 1901, Fisheries (NMI); 1♀, off Cleggan, from *Doris* sp., 29 September 1902, Fisheries (NMI); several specimens, Salt Lake (L6649), Clifden, *Serpula* reef, July 1980, B. O'Connor (NMI).

Marine, associated with sponges such as *Clathrina* and *Halichondria*. Light-trap. The listing of *Asteroches echinicola* (Norman) from 'north Ireland' in Gotto (1993) is based on Giesbrecht (1899). Giesbrecht interpreted the record of *Cyclopicera lata* from Lough Swilly (Brady, 1880) as if that species was a junior synonym of *A. echinicola*. However, *A. echinicola* is a separate species which has not yet been found around Ireland.

***Asterocheres lilljeborgi* Boeck, 1859**

(= *Artotrogus lilljeborgii* (Boeck, 1859))

Down: off Chapel Island, Strangford Lough (Heaney, 1966); **Mayo:** Westport Bay (Brady, 1880).

Marine, with asteroid echinoderms such as *Henricia* spp. and *Asterias rubens* L. (Bresciani and Lützen, 1962), and a sponge (Brady, 1880).

***Asterocheres parvus* Giesbrecht, 1897**

Cork: Lough Hyne (Holmes, 1991).

Marine, associated with sponges (Gotto, 1993).

***Asterocheres simulans* (T.Scott, 1898)**

Cork: Lough Hyne (Holmes, 1983); 1♂ 1♀, Lough Hyne (W100282), rock washing, 11 July 1993, JMCH (NMI); 1♂ 3♀♀, Lough Hyne (W100282), sponges, 28 June 1994, JMCH (NMI).

Marine, associated with sponges (Gotto, 1993).

***Asterocheres stimulans* Giesbrecht, 1897**

Cork: Lough Hyne (Holmes, 1991); 3♂♂ 2♀♀, Lough Hyne (W100282), sponges, 28 June 1994, JMCH (NMI).

Marine, associate unknown (Gotto, 1993).

***Asterocheres suberitis* Giesbrecht, 1899**

Cork: Lough Hyne (Holmes, 1991); 1♀, Lough Hyne (W099283), rock washing, 12 July 1995, JMCH (NMI).

Marine, with sponges *Amphilectus fucorum* (Esper) and *Suberites domuncula* (Olivier) (Holmes, 1991; Gotto, 1993).

***Asterocheres violaceus* (Claus, 1889)**

Cork: Lough Hyne, and off Galley Cove, near Crookhaven (Holmes, 1991); 1♂ 2♀♀, Whirlpool Cliff (W100283) Lough Hyne, from seven *Echinus esculentus* L., 13 July 1995, JMCH; **Down:** off Chapel Island, Strangford Lough (Heaney, 1966).

Marine, associated with a number of echinoderms, *Marthasterias glacialis* L., *Porania pulvillus* (O. F. Müller), *Solaster papposus* (L.), *Asterias rubens* and *Echinus esculentus* (Humes, 1986; Gotto, 1993).

***Collocheres elegans* A.Scott, 1896**

(= *Leptomyzon elegans* (A.Scott, 1896))

Cork: Lough Hyne (Holmes, 1996).

Marine, associated with ophiuroid *Ophiocomina nigra* (Abildgaard) (Gorzula, 1978). Sars (1915) described the oral cone of this species as having "2 remarkable diverging tentacular appendages, apparently attached to the posterior lip". The existence of these appendages was dismissed by Stock (1966), but they are clearly visible in the Lough Hyne material.

***Collocheres gracilicauda* (Brady, 1880)**

Cork: Lough Hyne (Holmes, 1985); 1♀, Lough Hyne (W099284), rock washing, 15 July 1992,

Bull. Ir. biogeog. Soc. 22

JMCH; 1♀, Lough Hyne (W100282), rock washing, 8 August 1992, JMCH; 1♀, Lough Hyne (W0928), from *Ophiothrix fragilis* (Abildgaard), August 1992, JMCH (NMI); 4♀♀, Lough Hyne (W100282), rock washing, 5m, 19 July 1993, JMCH; **Down**: off Chapel Island, Strangford Lough (Heaney, 1966); **Galway**: 1♀, Station L.167. off Coastguard Point (L6659), Ballynakill, 4-6 fathoms, 11 October 1902, Fisheries (NMI); 1♂, Keenaunnagark (L9622), near Cashla Bay, from *Asterias rubens*, 25 April 1986, G. O'Donnell (NMI).

Marine, usually associated with the ophiuroid *Ophiothrix fragilis* (Bresciani and Lützen, 1962). Light-trap.

Dermatomyzon nigripes (Brady and Robertson, 1876)

(= *Cyclopicera nigripes* Brady and Robertson, 1876)

Antrim: off Whitehead (Pearson, 1905); **Cork**: Lough Hyne (Holmes, 1983); 1♂, Sherkin Island (W006259), light-trap, 10m, 3 August 1987, JMCH (NMI); 2♂♂, Sherkin Island (W014259), light-trap, 4m, 3 August 1987, JMCH (NMI); 1♂, Lough Hyne (W095284), light-trap, 20m, 14 June 1997, JMCH (NMI); **Donegal**: Lough Swilly (Brady, 1880); **Galway**: Ballynakill (Farran, 1913); Spiddal (Holmes, 1986); **Galway/Mayo**: 1♀ 2juvs, Killary Harbour, *Serpula* reef, 4m, May 1984, D. Minchin (NMI); **Kerry**: 1♂, Knightstown (V4277), Valentia Island, light-trap, 3m, 21 July 1986, JMCH; **Waterford**: 1♂, Dunmore East (S6900), light-trap, 5m, coarse gravel, 23 June 1983, JMCH.

Marine, associate unknown (Gotto, 1993). Light-trap.

Rhynchomyzon purpurocinctum (T. Scott, 1893)

Cork: Barloge, near Lough Hyne (Holmes, 1991); 1♂, Lough Hyne (095287), light-trap, 25m, 10 June 1997, JMCH (NMI); **Galway**: Ballynakill (Farran, 1913); 1♀, Station L.167. off Coastguard Point (L6659), Ballynakill, 4-6 fathoms, 11 October 1902, Fisheries (NMI); **Wexford**: 1♀, south-west of Hook Head (X701911), coll. B. E. Picton, 5 September 1996, BIOMAR Survey (NMI).

Marine, associate unknown (Gotto, 1993). Light-trap.

Scottocheres elongatus (T. Scott and A. Scott, 1894)

Cork: Lough Hyne (Holmes, 1985, 1998); numerous specimens, Lough Hyne (W0928), rock washings and sponges, 1987-1997, JMCH (NMI); **Galway**: Ballynakill (Farran, 1913); 1♂, Station L.167. off Coastguard Point (L6659), Ballynakill, 4-6 fathoms, 11 October 1902,

Fisheries (NMI).

Marine, associated with sponges, e.g., *Halichondria panicea* (Gotto, 1993). Light-trap.

****Scottomyzon gibberum* (T. Scott and A. Scott, 1894)**

Dublin: 2♀, off Sandycove (O2-2-), trawl, 30m, *Asterias rubens*, RV 'Celtic Voyager', 17 July 1998, JMCH; **Galway:** 3♀, Salt Lake (L6649), Clifden, 6m, July 1982, D. Minchin (NMI); 3♀, Keenaunnagark (L9622), near Cashla Bay, from *Asterias rubens*, 25 April 1986, G. O'Donnell (NMI).

Marine, with asteroids *Asterias rubens* and *Marthasterias glacialis* (Kim, 1992). New to Ireland.

Artotrogidae

***Artotrogus orbicularis* Boeck, 1859**

Cork: Barloge, near Lough Hyne (Holmes, 1991); **Dublin:** Sandycove (Holmes, 1991).

Marine, apparently associated with nudibranch molluscs (Gotto, 1993). Light-trap. Both the Lough Hyne and the Sandycove specimens match the *A. orbicularis* of Giesbrecht (Giesbrecht, 1899) and not the new *A. sarsi* Kim (Kim, 1996) which is based on the figure of *A. orbicularis* in Sars (1915).

***Bradypontius magniceps* (Brady, 1880)**

Antrim: Larne Lough (Pearson, 1905).

Marine, associate unknown, possibly sponges (Gotto, 1993).

***Bradypontius papillatus* (T. Scott, 1888)**

Cork: Lough Hyne (Holmes, 1985, 1998); 1♀, Rapids area (W100281), Lough Hyne, coll. J. A. Kitching, July 1953, K. M. Roe (NMI); numerous specimens, Lough Hyne (W0928), sponges, 1988-1997, JMCH (NMI); **Galway:** 1♂, Station L.172. near Coastguard Deep (L6759), 3-8 fathoms, 22 October 1902, Fisheries (NMI); 1♀, Salt Lake (L6649), Clifden, *Serpula* reef, July 1980, B. O'Connor (NMI).

Marine, associated with sponge *Hymeniacidon perleve* (Montagu) (Holmes, 1998). Males in light-trap.

***Cryptopontius brevifurcatus* (Giesbrecht, 1895)**

Cork: Lough Hyne (Holmes, 1985); 1♀, Barloge (W100280), near Lough Hyne, coarse shell gravel, 24 July 1986, JMCH (NMI); several specimens, Barloge (W100280) near Lough Hyne,

gravel, 7 July 1994, JMCH (NMI); **Down:** off Chapel Island, Strangford Lough (Heaney, 1966).

Marine, associate uncertain, possibly *Echinus esculentus* (Gotto, 1993). Light-trap.

***Dyspontius striatus* Thorell, 1859**

Cork: Lough Hyne (Holmes, 1987); 1♂ 2♀♀, Lough Hyne (W100282), rock washing, 5m, 19 July 1993, JMCH (NMI); **Dublin:** 1♀, Dublin Bay (O2-3-), 3 December 1981, J. G. Wilson (NMI); **Galway:** Ballynakill (Farran, 1913).

Marine, associate uncertain (Gotto, 1993). Light-trap. In the Clare Island Survey report (Farran, 1913), species new to Ireland were marked with an asterisk. *D. striatus* was not so marked, indicating that Farran was aware of an earlier Irish record. However, the author has been unable to find any such record and the species is not mentioned in the comprehensive summary of records by Pearson (1905).

***Glannapontius maculatus* Holmes, 1998**

Cork: Lough Hyne (Holmes, 1998).

Marine, host uncertain, but possibly associated with the sponge *Haliclona cinerea* (Grant) (Holmes, 1998). Males in light-trap.

***Myzopontius pungens* Giesbrecht, 1895**

Cork: Lough Hyne (Holmes, 1991).

Marine, associated with sponges, usually *Clathrina* spp. (Schirl, 1973). Light-trap.

Nanaspidae

***Nanaspis ninae* Bresciani and Lützen, 1962**

Ireland: Porcupine Seabight, off west of Ireland (Humes, 1980).

Marine, on holothurian *Parastichopus tremulus* (Gunnerus) (Bresciani and Lützen, 1962).

Micropontiidae

****Micropontius ovoides* Gooding, 1957**

Dublin: 5♂♂ 6♀♀, South Dublin Bay (O2-3-), trawl, 20m, from one *Echinocardium cordatum* (L.), RV 'Celtic Voyager', 17 July 1998, JMCH (NMI).

Marine, associated with echinoid *Echinocardium cordatum* (Gooding, 1957). New to Ireland.

Cancerillidae

Cancerilla tubulata Dalyell, 1851

Cork: Lough Hyne (Holmes, 1985; Holmes and O'Connor, 1991); 1♂, Red Strand (W358327), Dirk Bay, near Clonakilty, light-trap, 5m, 14 August 1983, JMCH (NMI); 2♂♂, Castlehaven (W175293), light-trap, 5m, mud near *Zostera*, 17 August 1985, JMCH (NMI); 9♂♂, Sherkin Island (W006259), light-trap, 10m, 3 August 1987, JMCH (NMI); 5♂♂, Sherkin Island (W014259), light-trap, 4m, 3 August 1987, JMCH; **Down:** Strangford Lough area (Williams, 1954); **Dublin:** 1♂, Kelly's Rock (O3050), Lambay Island, light-trap, 15m, 20 June 1991, JMCH; 1♂, Tayleur Bay (O3251), Lambay Island, light-trap, 15m, 20 June 1991, JMCH; **Galway/Mayo:** Killary Harbour (Farran, 1913); **Waterford:** 6♂♂, Dunmore East (S6900), light-trap, 5m, coarse gravel, 23 June 1983, JMCH (NMI) - this occurrence is the basis of the record from 'south-east Ireland' in Gotto (1993).

Marine, females attached to underside of ophiuroids, e.g., *Amphipholis squamata* (Delle Chiaje), *Ophiocomina nigra*, *Ophiothrix fragilis* (Gotto, 1993). Males in light-trap. Although males are often encountered in light-traps set in Lough Hyne, examination of numerous specimens of the brittle-star *Amphipholis squamata* at the same locality has failed to reveal a single female copepod.

**Parartotrogus richardi* T.Scott and A.Scott, 1893

Dublin: 1♀, south Dublin Bay (O2-3-), trawl, 20m, from *Ophiura ophiura* (L.), RV 'Celtic Voyager', 17 July 1998, JMCH (NMI).

Marine, associated with ophiuroid *Ophiura ophiura* (Gotto, 1993). New to Ireland.

Family unknown

Apodomyzon brevicorne Stock, 1970

Cork: Lough Hyne (Holmes, 1991); 2♀♀, Lough Hyne (W100282), rock washing, 19 July 1993, JMCH (NMI); 1♀, Lough Hyne (W099283), rock washing, 12 July 1995, JMCH (NMI).

Marine, parasitic in sponge *Haliclona indistincta* (Bowerbank) (Stock, 1970).

Nicothoidae

Nicothoe astaci Audouin and H. Milne Edwards, 1826

Cork: 4 copepodids, Courtmacsherry Bay, from gills of *Homarus gammarus* (L.), 18 October 1986, J. Dorman (NMI); **Down:** Groomsport and Donaghadee (Gotto, 1954).

Marine, parasitic on gills of lobster *Homarus gammarus* and spiny lobster *Palinurus elephas* (Fabricius) (Gotto, 1993).

***Sphaeronella atyli* Hansen, 1897**

Cork: 1♀ 2juvs, Sherkin Island (W006259), light-trap, 10m, from *Atylus falcatus* Metzger, 3 August 1987, JMCH (NMI) (in Costello and Myers (1989a) as *Sphaeronella* sp. with *Atylus falcatus*); **Galway:** Mweenish (Gotto and McGrath, 1980).

Marine, in marsupium of amphipods *Atylus* spp. (Costello and Myers, 1989a). Host amphipod in light-trap.

***Sphaeronella danica* Hansen, 1897**

Galway: Kylesalia, Kilkieran Bay (Gotto and McGrath, 1980).

Marine, in marsupium of amphipods, e.g., *Erichthonius punctatus* (Bate) (Gotto, 1993).

***Sphaeronella leuckartii* Salensky, 1868**

Cork: Lough Hyne (Holmes, 1985; Costello and Myers, 1989a, 1989b); 8♂♂ 16♀♀, Sherkin Island (W006259), light-trap, 7m, with *Apherusa bispinosa* (Bate), 2 August 1987, JMCH; several specimens, Sherkin Island (W006259), light-trap, 10m, with *Apherusa bispinosa*, 3 August 1987, JMCH (NMI) (in Costello and Myers (1989a) as '*Sphaeronella* sp. with *Apherusa bispinosa*'); 1♀, Barloge (101279), near Lough Hyne, light-trap, 5m, with *Apherusa bispinosa*, 28 July 1985, JMCH (in Costello and Myers (1989a) as '*Sphaeronella* sp. with *Apherusa bispinosa*'); **Dublin:** Sandycove (Costello and Myers, 1989a); 1♀, Dalkey Sound (O272265), light-trap, 5m, with *Apherusa bispinosa*, 15 September 1985, JMCH (in Costello and Myers (1989a) as '*Sphaeronella* sp. with *Apherusa bispinosa*'); **Wicklow:** numerous specimens, Greystones (O294129), light-trap, 3m, with *Apherusa bispinosa*, 26 September 1982, JMCH.

Marine, in marsupium of amphipods, e.g., *Aora gracilis* (Bate), *Apherusa bispinosa* (Costello and Myers, 1989a; Gotto, 1993). Host amphipods in light-trap.

***Sphaeronella longipes* Hansen, 1897**

Clare/Galway: Galway Bay (Gotto and McGrath, 1980); **Cork:** 1♀, Whirlpool Cliff (W100283), Lough Hyne, light-trap, 20m, with ♂ *Ampelisca diadema* (A. Costa), 22 Aug. 1983, JMCH (in Costello and Myers (1989a) as '*Sphaeronella* sp. with *Ampelisca diadema*').

Marine, in marsupium of amphipod *Ampelisca* spp. (Gotto, 1993). Host amphipod in light-

trap.

***Sphaeronella minuta* T. Scott, 1904**

Dublin: 1♀, the '40-Foot', Sandycove (O259281), light-trap, 10m, with *Periocolodes longimanus* (Bate and Westwood), 9 January 1983, JMCH (NMI) (this occurrence is the basis of the record from 'south-west Ireland' in Gotto (1993) (Gotto, pers. comm.).

Marine, in marsupium of amphipods, e.g., *Periocolodes longimanus* and *Pontocrates arenarius* (Bate) (Gotto, 1993). Host amphipod in light-trap.

***Sphaeronella paradoxa* Hansen, 1897**

Cork: Lough Hyne (Holmes, 1985; Costello and Myers, 1989a); 4♂♂ 2♀♀ 1juv., Sherkin Island (W006259), light-trap, 10m, with *Bathyporeia guilliamsoniana* (Bate), 3 August 1987, JMCH (NMI) (in Costello and Myers (1989a) as '*Sphaeronella* sp. with *Bathyporeia guilliamsoniana*'); 2♀♀, Sherkin Island (W014259), light-trap, 4m, with *Periocolodes longimanus*, 3 August 1987, JMCH (NMI) (in Costello and Myers (1989a) as '*Sphaeronella* sp. with *Periocolodes longimanus*'); **Wexford:** Pollshone (Gotto and McGrath, 1980).

Marine, in marsupium of amphipods, notably *Bathyporeia elegans* Watkin, other *Bathyporeia* spp., and *Periocolodes longimanus* (Gotto, 1993). Host amphipods in light-trap.

***Sphaeronella vararensis* T. Scott, 1905**

Cork: 1♀, Sherkin Island (W006259), light-trap, 10m, from *Megaluropus agilis* Hoek, 3 August 1987, JMCH (NMI) (in Costello and Myers (1989a) as '*Sphaeronella* sp. with *Megaluropus agilis*'); **Dublin:** Sandycove (Costello and Myers, 1989a).

Marine, marsupium of amphipod *Megaluropus agilis* (Costello and Myers, 1989a). Host amphipods in light-trap.

Boxshall and Defaye (1995) give the locality for '*Sphaeronella* sp. (Scott, 1905)' from the cumacean *Hemilamprops rosea* (Norman) as being 'Irelande'. However, the locality given in Scott (1905) is Loch Fyne, which is on the west coast of Scotland. This form may well be *S. rotundata* Hansen, a parasite of *Hemilamprops cristata* Sars, (Boxshall and Defaye, 1995).

Melinnacheridae

***Melinnacheres steenstrupi* (Bresciani and Lützen, 1961)**

Galway: Kilkieran Bay (Gotto and O'Connor, 1980).

Marine, parasitic on the gills of polychaete *Terebellides stroemi* M. Sars (Gotto, 1993).

Bull. Ir. biogeog. Soc. 22

Phyllodicolidae

Cyclorhiza megalova Gotto and Leahy, 1988

Galway: Dunkellin area, east Galway Bay (Gotto and Leahy, 1988).

Marine, attached to polychaete *Eteone longa* (Fabricius) (Gotto and Leahy, 1988).

Herpyllobiidae

Herpyllobius polynoes (Krøyer, 1863)

Galway: inner Galway Bay (Gotto and O'Connor, 1980).

Marine, attached to polynoid polychaetes (Gotto, 1993).

Sponginticolidae

Sponginticola uncifer Topsent, 1928

(= *Clionophilus vermicularis* Silén, 1963)

Down: Strangford Lough (Gotto, 1965).

Marine, sponges, e.g., *Cliona celata* Grant (Gotto, 1965).

Caligidae

Caligus belones Krøyer, 1863

Cork: Courtmacsherry Bay (Dorman and Holmes, 1991); 1♂ 3♀, Courtmacsherry Bay, from short-beaked garfish *Belone svetovidovi* Collette and Parin, 5 August 1994, J. Dorman; several specimens, 6 miles south-west of Seven Heads (W4-2-), from garfish *Belone belone* (L.), 11 August 1995, J. Dorman; 1♂, Courtmacsherry Bay, from *Belone svetovidovi*, 30 August 1996, J. Dorman.

Marine, parasitic on garfish *Belone belone* (Cressey and Collette, 1970).

**Caligus bonito* Wilson, 1905

Kerry: 10♀♀, Brandon Bay area, from gill covers of bonito *Sarda sarda* (Bloch), 1984, F. O'Shea (NMI).

Marine, a parasite on large scombrid fishes (Kabata, 1979; Cressey and Cressey, 1980). New to Ireland.

Caligus centrodoni Baird, 1850

Dublin: Dublin (Baird, 1850); **Galway/Mayo:** Killary Harbour (Holmes and Minchin, 1995).

Marine, parasitic on several perciform fish, commonly red sea-bream *Pagellus bogaraveo* (Brünnich), and wrasses such as *Labrus bergylta* Ascanius (Kabata, 1979).

***Caligus curtus* O. F. Müller, 1785**

(= *Caligus mülleri* Leach, 1816)

Antrim/Down: Belfast Bay (W. Thompson, 1847, 1856; Baird, 1850, as *C. mülleri* and *C. diaphanus*, probably this species (Kabata, 1979)); **Cork:** Bantry Bay (O'Riordan, 1966b; Minchin, 1991); Lough Hyne (Holmes, 1980; Quigley, 1986); Courtmacsherry Bay (Minchin, 1991); 6 specimens, south of Dunworly Point (W4-30), from *Molva molva* (L.), 18 July 1981, J. Dorman; 1♀ 3juvs, off Barloge (W0927), from two *Pollachius pollachius* (L.), 3-4 July 1994, JMCH; 3♂♂ 7♀♀, Courtmacsherry Bay, from *Molva molva*, 40-60m, 9 August 1995, J. Dorman; 7 specimens, off Old Head of Kinsale (W6-3-), from *Molva molva*, 22 August 1995, J. Dorman; 4 specimens, off Old Head of Kinsale (W6-3-), from *Pollachius pollachius*, 24 August 1995, J. Dorman; **Down:** Ardglass (Williams, 1954); **Dublin:** Dublin Bay (O'Riordan, 1966b); **Galway:** 3♀♀ 1juv., Station 80. off Slyne Head, 55 fathoms, from coal-fish *Pollachius virens* (L.) (as *Gadus virens*), 18 July 1890, Royal Dublin Society Fish Survey (NMI); 1♀, the Stags (L5067), Inishbofin, from *Pollachius pollachius*, 19 July 1995, E. J. Holmes; **Kerry:** Dingle Bay, from a 'cod' (O'Riordan, 1966b) - the material, 2♀♀ in NMI, is labelled 'St.7. 19 May 1890'. According to Holt (1891), Station 7 was in Dingle Bay, 22 fathoms, 12 May 1890. However, according to the Log (lodged in NMI), Station VII (emended to Station 9) was off Benacry Head, Valentia, 40 fathoms, 19 May 1890. Cod *Gadus morhua* L. were taken at both stations. The most likely locality is off Valentia on 19 May; **Ireland:** North of Ireland (W. Thompson, 1856, as *C. mülleri*); Rockall area (Calman and Wright, 1897) - vouched for by four specimens in NMI, labelled as *C. mulleri*, from coal-fish; off the west coast of Ireland (O'Riordan, 1966b).

Marine, parasitic on a wide variety of fish, notably gadoids (O'Riordan, 1966b; Parker *et. al.*, 1968). The *C. curtus* recorded by Quigley (1986) living on thick-lipped grey mullet *Chelon labrosus* (Risso) (as *Crenimugil labrosus*) from Lough Furnace, Co. Mayo is here re-identified as *C. pageti*.

***Caligus diaphanus* von Nordmann, 1832**

Down: Ardglass (Williams, 1954).

Marine, parasitic on a variety of fish, notably gurnards (Kabata, 1979). Thompson's (1847) and Baird's (1850) records of *C. diaphanus* probably represent a complex of several caligid

species, including *C. curtus* (Kabata, 1979).

***Caligus elongatus* von Nordmann, 1832**

(= *Caligus rapax*, *sensu* Baird, 1850)

Antrim: Larne Lough (Pearson, 1905); **Antrim/Down:** Belfast Bay (Baird, 1850); **Cork:** Berehaven (Herdman, 1891; Jackson and Minchin, 1993); Bantry Bay (O'Riordan, 1966b, as *C. zeii*, in a collection from an assemblage of 'cod, hake, skate, black pollack, turbot, grey gurnard, ling and blenny' (NMI)); off Ballycotton (Cross and Johnson, 1976); Lough Hyne (Holmes, 1980; Holmes and O'Connor, 1991); Courtmacsherry Bay (Dorman and Holmes, 1991); entrance to Bantry Bay (Minchin, 1991); 1♀, Log 9. mouth of Kenmare River, 41-38 fathoms, August 1885, Royal Irish Academy Survey (NMI); 1♂ 10♀♀, Lough Hyne (W096284), from *Pleuronectes flesus* L., 23 July 1981, D. Minchin; 2♂♂ 3♀♀ Lough Hyne (W092283), from *Pollachius pollachius*, 30 July 1981, D. Minchin; 2♀♀, River Blackwater, Youghal, skin of *Salmo salar* L., July 1983, R. Fitzgerald (NMI); several ♂♂, Lough Hyne (W0928) light-traps, 1981-1997, JMCH (NMI); 1♂, Castlehaven (W175293), light-trap, 5m, mud near *Zostera*, 17 August 1985, JMCH; 1♂ 1♀, off Barloge (W1027), from *Pollachius pollachius*, 4 July 1994, JMCH; 3juvs, Lough Hyne (W100282), from *Sprattus sprattus* (L.), 7 July 1994, N. M. Holmes (NMI); several specimens, Courtmacsherry Bay, from *Cyclopterus lumpus* L., 14 April 1994, J. Dorman; 1 specimen, 6 miles south-west of Seven Heads (W4-2-), from *Belone belone*, 11 August 1995, J. Dorman; 13♀♀, Courtmacsherry Bay, from *Prionace glauca* (L.), 12 August 1994, J. Dorman; 1♀, Courtmacsherry Bay, from *Belone svetovidovi*, 30 August 1996, J. Dorman; **Donegal:** Lough Swilly, Mulroy Bay, and McSwyne Bay (Jackson and Minchin, 1993); **Down:** Ardglass (Williams, 1954); Dunynneil Island, Strangford Lough (Boyd, 1973); **Dublin:** Dalkey (O'Riordan, 1966a); Dublin Bay (O'Riordan, 1966b); **Galway:** Cleggan (Farran, 1903, as *Caligus*; Pearson, 1905, as *C. rapax*); Mutton Island (Fives, 1969); off Slyne Head (O'Riordan, 1966b) - 3♀♀ in NMI from the same station besides the single ♂ mentioned by O'Riordan; Ballinakill, Ardbear, and Mannin, Bertraghboy, Kilkieran Bays, Lettermullen, Ardnamackan Rocks (Jackson and Minchin, 1993); 3 copepodids, Ardmore, Kilkieran Bay, September 1986, R. Taylor; **Galway/Mayo:** Killary Harbour (Minchin, 1991; Jackson and Minchin, 1993; Costelloe *et al.*, 1996b; Holmes and Minchin, 1995); **Kerry:** Valentia (I. C. Thompson, 1897, 1900); Dinish Island, Kilmakilloge, Coulagh

Bull. Ir. biogeog. Soc. 22

Bay (Jackson and Minchin, 1993); 1♀, off the Skelligs, 62-52 fathoms, 20 August 1890, Royal Dublin Society Fish Survey (NMI); **Louth/Meath**: near the Boyne Estuary (Minchin, 1991); **Mayo**: Clare Island (Jackson and Minchin, 1993); **Wexford**: south-east of Hook Head (Minchin, 1991); 2♂♂, 4 miles east of Great Saltee (X8796), 18 October 1978, R. Grainger (NMI); **Ireland**: mid-west coast of Ireland (Tully, 1989).

Marine, associated with a wide variety of fishes (Kabata, 1979). Light-trap. Older records refer to this species as *C. rapax*.

***Caligus labracis* T. Scott, 1902**

Galway/Mayo: Killary Harbour (Holmes and Minchin, 1995).

Marine, parasitic on wrasses *Labrus bergylta* and *L. mixtus* L. (Kabata, 1979).

***Caligus minimus* Otto, 1821**

Kerry: Dingle (Holmes and O'Connor, in press); **Wexford**: Saint Helen's Bay (Holmes and O'Connor, in press).

Marine, parasitic on bass *Dicentrarchus labrax* (L.) Scott and Scott, 1913). A record from a halibut in Belfast market (W. Thompson, 1856, as *Caligus minutus* [sic]) is regarded as extremely doubtful (Kabata, 1979), partly because the host is wrong and partly because Thompson says that "It differs very little - hardly in species - from *C. hippoglossi*, Kroyer". On 25 July 1984, the author found a single male specimen of *C. minimus* in a light-trap set at Carnac, Brittany, on the west coast of France.

****Caligus pageti* Russell, 1925**

Antrim/Down: Belfast, from *Chelon labrosus* (as *Mugil chelo*) (Baird, 1850, as *Caligus mülleri*, possibly this species); **Cork**: 1♀, Courtmacsherry Bay, from *Chelon labrosus*, 4 August 1995, D. Minchin (NMI); **Mayo**: Lough Furnace (Quigley, 1986, as *Caligus curtus*) (NMI); **Waterford**: 1♂ 1♀, off Helvick Head, 29 July 1995, D. Minchin.

Marine to brackish water, parasitic on mullets, e.g. thick-lipped grey mullet *Chelon labrosus*, flathead grey mullet *Mugil cephalus* L., and several *Liza* spp. in the Mediterranean (Raibaut *et al.*, 1998). On 23 July 1984, the author found a single female specimen of *Caligus pageti* in a light-trap set at Carnac, Brittany, on the west coast of France. New to Ireland.

***Caligus pelamydis* Krøyer, 1863**

Antrim/Down: Belfast Bay (Baird, 1850, as *Chalimus scombri*, possibly this species); **Cork**:

Bull. Ir. biogeog. Soc. 22

Courtmacsherry Bay (Dorman and Holmes, 1991); Barloge Creek, near Lough Hyne (Holmes, 1991); several specimens, Barloge (W102272), *Scomber scombrus* L., 19 July 1992, JMCH (NMI); **Down**: Strangford Lough area (Williams, 1954); **Galway/Mayo**: Killary Harbour (Holmes and Minchin, 1995).

Marine, parasitic on the gills of scombrids, e.g., mackerel *Scomber scombrus* (Kabata, 1979). The record of '*Caligus scombri*, J. V. Thompson' (W. Thompson, 1856) from 'South of Ireland' might possibly refer to this species, but Pearson (1905) regarded its identity as very uncertain.

***Caligus zei* Norman and T. Scott, 1906**

Cork: Long Island Sound (O'Riordan, 1966b); **Galway/Mayo**: Killary Harbour (Holmes and Minchin, 1995).

Marine, parasitic on john dory *Zeus faber* L. (Scott and Scott, 1913). Records from Bantry Bay in O'Riordan (1966b) are not correct, as all the specimens are here re-identified as *Caligus elongatus*.

****Lepeophtheirus crassus* (Wilson and Bere, in Bere, 1936)**

Cork: 2♀♀, between Cape Clear Island and Fastnet Rock, from *Remora remora* (L.), 29 August 1991, G. Bolster (NMI).

Marine, parasitic on remoras (Yamaguti, 1963). It is a widely-distributed species, described originally from the Gulf of Mexico (Bere, 1936), but also known from the Bay of Bengal (Shiino, 1960). New to Ireland.

***Lepeophtheirus hippoglossi* (Krøyer, 1837)**

(= *Lepeophtheirus obscurus* Baird, 1850)

Mayo: off the Bills (O'Riordan, 1966b).

Marine, parasitic on halibut *Hippoglossus hippoglossus* (L.) (Scott and Scott, 1913). An early record (as *Caligus minutus* [sic], Otto) from a halibut in Belfast market in February 1837 (W. Thompson, 1847, 1856) may well have been this species.

***Lepeophtheirus nordmanni* (H. Milne Edwards, 1840)**

(= *Caligus nordmanni* Milne Edwards, 1840)

Antrim: Co. Antrim coast (Baird, 1850; W. Thompson, 1856); **Cork**: Bantry Bay (O'Riordan, 1966b); **Donegal**: off Co. Donegal (Hillis and O'Riordan, 1960); **Galway**: between Slyne Head

Bull. Ir. biogeog. Soc. 22

and High Island (Cooper *et al.*, 1982); **Mayo**: off Achill (O'Riordan, 1966b); **Sligo**: 2♂♂ 5♀♀, off Bomore Rock (G5857), from *Mola mola* (L.), 13 August 1989, D. Cotton (NMI).

Marine, parasitic on sunfish *Mola mola* (Kabata, 1979).

***Lepeophtheirus pectoralis* (O. F. Müller, 1777)**

(= *Caligus pectoralis* O. F. Müller, 1777)

Antrim/Down: Belfast Bay (Baird, 1850); Belfast market (W. Thompson, 1856); **Cork**: Lough Hyne (Holmes, 1980; Holmes and O'Connor, in press); Cork Harbour (Holmes and O'Connor, in press); 10 specimens, Courtmacsherry Pier (W5042), from *Pleuronectes flesus*, 16 June 1980, J. Dorman; several specimens, Lough Hyne (W094288), from pectoral fins of *Pleuronectes flesus*, 8 July 1981, JMCH (NMI); 2♂♂ 5♀♀ 1 juv., Lough Hyne (W096284), from *Pleuronectes flesus*, 23 July 1981, D. Minchin; 2♂♂, the Goleen (W096278), Lough Hyne, from *Pleuronectes flesus*, 24 July 1994, D. Minchin; **Cork/Kerry**: off the south-west coast of Ireland (O'Riordan, 1966b); **Dublin**: 1♀, off Sandycove (O2-3-), trawl, 30m, from pectoral fin of *Pleuronectes platessa* L., RV 'Celtic Voyager', 17 July 1998, JMCH; **Wexford**: Cahore (Quigley and Flannery, 1994); Saint Helen's Bay (Holmes and O'Connor, in press).

Marine, parasitic, predominantly on the skin of pleuronectid flatfishes (Kabata, 1979).

****Lepeophtheirus pollachius* Bassett-Smith, 1896**

Cork: 1♂, near the Kedges (W0624), from gill of *Pollachius pollachius*, 14 July 1981, JMCH.

Marine, parasitic on pollack *Pollachius pollachius*, coal-fish *Pollachius virens* and ling *Molva molva* (Kabata, 1979). New to Ireland.

***Lepeophtheirus salmonis* (Krøyer, 1838)**

(= *Caligus stromii* Baird, 1848)

(= *Lepeophtheirus stromii* (Baird, 1848))

(= *Caligus vespa* Milne Edwards, 1840)

Antrim: River Bush, near Portrush (Baird, 1850); Cushendun (Baird, 1850); **Cork**: Lough Hyne (Holmes, 1985); Bere Haven (Jackson and Minchin, 1993); Argideen (Tully *et al.*, 1993b); 3♂♂ 3♀♀ 2juvs, Mulroe Cove (V9240), near Durrus, Dunmanus Bay, 13 August 1979, JMCH (NMI); 4♀♀, River Blackwater, Youghal, skin of *Salmo salar*, July 1983, R. Fitzgerald (NMI); 1juv., Lough Hyne (W095286), light-trap, 25m, 11 June 1997, JMCH (NMI); **Donegal**: Lough Swilly, Mulroy Bay, and McSwyne Bay (Jackson and Minchin, 1993);

Down: Dundrum Bay (W. Thompson, 1847, 1856); Donaghadee (W. Thompson, 1847, 1856; Baird, 1850); **Galway:** off Cleggan (O'Riordan, 1966b) - one female specimen confirmed by the author, but the seven males mentioned in the above paper are re-identified here as *Caligus elongatus*; Glassillaun, estuaries of Crumlin River, Owenboliska River, and Cashla River (Tully *et al.*, 1993a); estuaries of Costello River, Dowras River, and Gowla River (Tully *et al.*, 1993a, 1993b); Ballynakill (Jackson and Minchin, 1993; Tully and Whelan, 1993); Ardbear, Lettermullen, and Ardnamackan Rocks (Jackson and Minchin, 1993); Kilkieran Bay, Bertraghboy Bay, and Mannin Bay (Jackson and Minchin, 1993; Tully and Whelan, 1993); Clifden River (Tully *et al.*, 1993a, 1993b; Tully and Whelan, 1993); Ardmore Bay, Kilkieran Bay (Costelloe *et al.*, 1996a, 1996b); River Corrib (Tully and Whelan, 1993); **Galway/Mayo:** Killary Harbour (Tully *et al.*, 1993a, 1993b; Jackson and Minchin, 1993; Tully and Whelan, 1993; Holmes and Minchin, 1995; Costelloe *et al.*, 1995, 1996b, 1998); **Kerry:** estuaries of Owenmore and Feale Rivers (Tully *et al.*, 1993a) Currane Estuary (Tully *et al.*, 1993a, 1993b); estuary of Inney River (Tully *et al.*, 1993b); Dinish Island, Kilmakilloge, and Coulagh Bay (Jackson and Minchin, 1993); 5 ♀♀, Lough Currane (V5264), from sea trout *Salmo trutta* L., 1979, J. P. O'Connor (NMI); **Mayo:** Clew Bay (Tully *et al.*, 1993a; Tully and Whelan, 1993); Owengarve and Newport Estuaries (Tully *et al.*, 1993b); Burrishoole System (Tully *et al.*, 1993a, 1993b); Owenduff (Tully *et al.*, 1993b); Clare Island (Jackson and Minchin, 1993); River Moy (Tully and Whelan, 1993); **Sligo:** Drumcliffe Bay (Tully *et al.*, 1993a, 1993b; Tully and Whelan, 1993); Ballynahinch River (Tully *et al.*, 1993a); **Ireland:** Lough Neagh (Baird, 1850, as *Caligus rapax* and *C. mülleri*, probably this species); widespread in Ireland (Kane, 1966); Ireland (O'Riordan, 1966b); mid-west coast of Ireland (Tully, 1989). The record of '*Caligus salaris* ? J. V. Thompson' (W. Thompson, 1856) from 'South of Ireland' might well refer to this species.

Marine, but can be found in freshwater, a serious pest of salmonid fish (e.g., Fryer, 1982; Tully, 1989). Juveniles only in light-trap.

***Lepeophtheirus thompsoni* Baird, 1850**

Antrim/Down: Belfast Bay (Baird, 1850); **Cork:** Dubeacon Harbour, Dunmanus Bay (O'Riordan, 1966b); **Kerry:** 1 ♀, Brandon Bay, *Scophthalmus maximus* (L.), October 1991, D. Quigley (NMI).

Bull. Ir. biogeog. Soc. 22

Marine, parasitic on the gills of turbot *Scophthalmus maximus* and brill *S. rhombus* (L.) (Kabata, 1979).

***Pseudocaligus brevipedis* (Bassett-Smith, 1896)**

Cork: Lough Hyne (Holmes, 1985); **Down:** Ardglass (Williams, 1954); **Galway/Mayo:** Killary Harbour (Holmes and Minchin, 1995); **Ireland:** 2♀♀ 1juv., Porcupine Bank, from bigeye rockling *Antonogadus macrophthalmus* (Günther), 14 June 1988, D. Quigley and K. Flannery (NMI).

Marine, parasitic on rocklings, e.g., *Gaidropsarus mediterraneus* (L.) and *G. vulgaris* (Cloquet) (Kabata, 1979).

Trebiidae

***Trebius caudatus* Krøyer, 1838**

Antrim/Down: Belfast Bay (W. Thompson, 1847, 1856; Baird, 1850); **Cork:** Bantry Bay (O'Riordan, 1966b); **Down:** Strangford Lough (Williams, 1954); **Dublin:** Dublin Bay (O'Riordan, 1966b); **Mayo:** 3♀♀, Clew Bay, from 'skate', 28 June 1890, Royal Dublin Society Fish Survey (NMI).

Marine, parasitic on many elasmobranchs, e.g., *Raja batis* L. and *R. clavata* L. (Kabata, 1979).

Pandaridae

***Dinemoura producta* (O. F. Müller, 1785)**

(= *Caligus productus* O. F. Müller, 1785)

(= *Dinematura producta* (O. F. Müller, 1785))

Antrim/Down: Belfast Bay (W. Thompson, 1856); **Down:** Holywood (Scott, 1963); **Galway:** off Cleggan (O'Riordan, 1966b); **Mayo:** off Achill Head (O'Riordan, 1966b); **Ireland:** North of Ireland (W. Thompson, 1856).

Marine, parasitic on sharks, notably thresher *Alopias vulpinus* (Bonnaterre), porbeagle *Lamna nasus* (Bonnaterre) and basking shark *Cetorhinus maximus* (Gunnerus) (Scott and Scott, 1913). Pearson (1905) and Scott and Scott (1913) interpreted the W. Thompson records of *Caligus productus* from 'North of Ireland' and Belfast Bay as being *Demoleus paradoxus* Otto (now *Demoleus heptapus* (Otto)), a parasite on sharks of the genus *Hexanchus* (Kabata, 1979). However, it could just as easily be *Dinemoura producta* as there was no host mentioned in

Bull. Ir. biogeog. Soc. 22

Thompson (1856).

***Echthrogaleus coleoptratus* (Guérin-Méneville, 1837)**

Cork: Dunbeacon Harbour, Dunmanus Bay (O’Riordan, 1966b); 2♀♀, Courtmacsherry Bay, from *Prionace glauca*, 24 June 1980, J. Dorman (NMI); 1♀, Courtmacsherry Bay, from *Prionace glauca*, 12 August 1981, J. Dorman (NMI); 7♀♀, south of Courtmacsherry Bay, from *Prionace glauca*, 8 August 1995, K. Cashman (NMI); **Down:** Dundrum Bay (Williams, 1954).

Marine, a common parasite on the outside of sharks, notably mako *Isurus oxyrinchus* Rafinesque (Kabata, 1979).

***Pandarus bicolor* Leach, 1816**

Cork: 1♀, Courtmacsherry Bay, from *Squalus acanthias* L., 22 September 1981, J. Dorman (NMI); **Kerry:** 30 miles off Valentia Island (O’Riordan, 1966b); 3♀♀, Dingle Bay, trawl, from anal fin of *Squalus acanthias*, MFV ‘Elsie Marie’ (skipper, Billy Granville), 24 June 1991, D. Quigley and K. Flannery (NMI); **Ireland:** off the south-west coast of Ireland (O’Riordan, 1966b).

Marine, parasitic on the skin of various dog-fishes and sharks (Scott and Scott, 1913).

Cecropidae

***Cecrops latreillii* Leach, 1816**

Antrim: Co. Antrim coast (W. Thompson, 1856); **Cork:** Kinsale (W. Thompson, 1844); ‘S of Ireland’ (W. Thompson, 1856); **Donegal:** off Co. Donegal (Hillis and O’Riordan, 1960); 2♂♂ 2♀♀, Lough Swilly, from gills of *Mola mola*, 1888, W. F. de V. Kane (NMI); **Dublin:** Dublin (W. Thompson, 1856); **Galway:** between Slyne Head and High Island (Cooper *et al.*, 1982); **Mayo:** off Achill (O’Riordan, 1966b); **Ireland:** off the south-west coast of Ireland (O’Riordan, 1966b).

Marine, parasitic on the gills of sunfish *Mola mola* (Scott and Scott, 1913).

***Orthogoriscicola muricata* (Krøyer, 1837)**

Galway: between Slyne Head and High Island (Cooper *et al.*, 1982).

Marine, parasitic on the skin of sunfish *Mola mola* (Kabata, 1979).

***Philorthogoriscus serratus* (Krøyer, 1863)**

Cork: Bantry Bay (O’Riordan, 1966b); **Galway:** between Slyne Head and High Island (Cooper

Bull. Ir. biogeog. Soc. 22

et al., 1982); **Mayo**: off Achill Island (O’Riordan, 1966b).

Marine, parasitic on the skin of sunfish *Mola mola* (Kabata, 1979).

Dichelesthiidae

Dichelesthium oblongum (Abildgaard, 1794)

(= *Dichelesthium sturionis* Hermann, 1804)

Ireland: ‘S. of Ireland’ (W. Thompson, 1856, as *Dichelestion sturionis*); west coast of Ireland (O’Riordan, 1966b).

Marine, parasitic on sturgeons, e.g., *Acipenser sturio* L. (Kabata, 1979).

Eudactylinidae

Nemesis lamna Risso, 1826

Down: Holywood, on *Cetorhinus maximus* (Gunnerus) (Scott, 1963).

Marine, parasitic on several species of shark (Yamaguti, 1963). The variety which occurs on the gills of basking shark *Cetorhinus maximus* is called form *vermi* A. Scott (Kabata, 1979).

Hatschekiidae

**Congericola pallidus* van Beneden, 1854

Cork: 1♀, Baltimore (W0426), from gill of *Conger conger* (L.), July 1994, JMCH (NMI).

Marine, attached to gills of conger *Conger conger* (Kabata, 1979). Kabata (1992) mentions its distribution around the British Isles as ‘all sea areas’. However, the above listing from Baltimore is the first definite record from around Ireland which the author has been able to establish. New to Ireland.

Lernanthropidae

Lernanthropus kroyeri van Beneden, 1851

Wexford: Saint Helen’s Bay (Holmes and O’Connor, in press).

Marine, parasitic on the gills of bass *Dicentrarchus labrax* (L.) (Scott and Scott, 1913).

Pennellidae

Lernaeenicus encrasicoli (Turton, 1807)

(= *Lerneonema encrasicoli* (Turton, 1807))

Cork: Youghal (Baird, 1850, as *Lerneonema encrasicoli*; W. Thompson, 1856, as *Lerneonema monillaris*); 1♀, Castletownbere (V6-4-), from *Sprattus sprattus*, November 1983, D. Osborne (NMI); **Ireland**: northern coast of Ireland, Ordnance Survey Collection (O’Riordan, 1966b).

Bull. Ir. biogeog. Soc. 22

Marine, attached to body of sprat *Sprattus sprattus* (Kabata, 1979).

***Lernaeenicus sprattae* (Sowerby, 1806)**

(= *Lerneonema monillaris* Milne Edwards, 1840)

Cork: Youghal (W. Thompson, 1844); **Dublin:** Dublin Bay (O'Riordan, 1966b); **Ireland:** northern coast of Ireland, Ordnance Survey Collection (O'Riordan, 1966b).

Marine, attached to eye of sprat *Sprattus sprattus* and pilchard *Sardina pilchardus* (Walbaum) (Kabata, 1979).

***Lernaeocera branchialis* (L., 1767)**

(= *Lernaea branchialis* L., 1767)

(= *Lerneia branchialis* (L. 1767))

(= *Lernaeocera obtusa* Kabata, 1958)

Antrim/Down: Belfast Bay (Baird, 1850; W. Thompson, 1856); **Cork:** Dunbeacon Harbour, Dunmanus Bay (O'Riordan, 1966b); **Dublin:** Dublin (Baird, 1850; W. Thompson, 1856); Dublin Bay (O'Riordan, 1966b); **Galway:** Mutton Island, Galway Bay (Fives, 1969); **Galway/Mayo:** Killary Harbour (Holmes and Minchin, 1995); **Kerry:** 3 ♀♀, Dingle Bay, from gill of *Merlangius merlangus* (L.), 7 November 1989, D. Quigley and K. Flannery.

Marine, parasitic on the gills of gadoids and a pest of cod *Gadus morhua*, whiting *Merlangius merlangus* and haddock *Melanogrammus aeglefinus* (L.) (Kabata, 1997).

***Lernaeocera luscii* (Bassett-Smith, 1896)**

Kerry: west of the New Ground, Dingle Bay (O'Riordan, 1961, 1962, 1964); 2 ♀♀, west-north-west of Skelligs, from gills of *Phycis blennoides* (Brünnich), April 1984, K. Flannery (NMI); 1 ♀, west-north-west of Skelligs, from gill of *Capros aper* (L.), April 1984, K. Flannery (NMI); **Ireland:** 4 ♀♀, Porcupine Bank, from *Antonogadus macrophthalmus*, 14 June 1988, D. Quigley and K. Flannery (NMI).

Marine, attached to gills of gadoids such as pouting *Trisopterus luscus* (L.) and greater fork-beard *Phycis blennoides* (O'Riordan, 1962; Kabata, 1979). Another species, *Lernaeocera minuta* (T. Scott), is described by Kabata (1992) as occurring in all sea areas round the British Isles, but the author has been unable to trace any mention of it specifically from around Ireland. Also, Kabata (1992) expressed the opinion that *L. minuta* is of uncertain validity and may be simply a dwarf form of *L. luscii*, living on small host fish such as sand goby

Bull. Ir. biogeog. Soc. 22

Pomatoschistus minutus (Pallas).

Pennella balaenoptera Koren and Danielssen, 1877

Mayo: Belmullet (Scharff, 1913).

Marine, attached to cetaceans (Kabata, 1992). A single ♀ specimen identified as '*Pennella*', attached to a bottle-nosed whale *Hyperoodon ampullatus* (Forster) stranded at Ring, Co. Cork (Smiddy, 1986), may possibly belong to the present species, but this cannot be confirmed.

Pennella filosa (L., 1758)

(= *Pennella orthogorisci* Wright, 1870)

Cork: Cork Harbour (Wright, 1870); 6♀♀, between Cape Clear Island and Fastnet Rock, from *Remora remora*, 29 August 1991, G. Bolster (NMI); Galway: between Slyne Head and High Island (Cooper *et al.*, 1982); Ireland: off south-west coast of Ireland (Pollock, 1994).

Marine, attached to large scombrids of the genus *Thunnus*, swordfish *Xiphias gladius* L. and sunfish *Mola mola* (Kabata, 1979).

Sphyrriidae

Lophoura edwardsi Kölliker, 1853

(= *Rebelula edwardsi* (Kölliker, 1853))

Ireland: Station I. off south-west Ireland, HMS 'Research' (Scott and Scott, 1913; Yamaguti, 1963).

Marine, attached to macrourid *Caelorinchus caelorhincus* (Risso) (Kabata, 1979).

**Sphyrion lumpi* (Krøyer, 1845)

Ireland: 1♀, Station S.R.1690. Porcupine Slope, trawl, from 'Mora', 19 August 1913, Fisheries (NMI). New to Ireland.

Marine, parasitic on several deep-water fish (Kabata, 1979).

Lernaeopodidae

**Advena paradoxa* (van Beneden, 1851)

Cork: 5♀♀ (each with dwarf ♂ attached), off Sevenheads, trawl, from gills of *Scomber scombrus*, November 1983, R. Fitzgerald (NMI). New to Ireland.

Marine, parasitic on gills of mackerel *Scomber scombrus* (Kabata, 1992).

**Brachiella thynni* Cuvier, 1830

Kerry: 2♀♀ (one with dwarf ♂ attached), Station 9. off Benacry Head, Valentia, 40 fathoms,

from under pectoral fin of supposed king fish, 19 May 1890, Royal Dublin Society Fish Survey (NMI).

Marine, parasitic on the outer surface of various species of tuna and related scombrids (Kabata, 1979). The host of the above-mentioned copepods is a bit of mystery. What is a king fish? The term is not mentioned in recent fish books, but Forbes (1905) lists king-fish as one of the many names for a dogfish. Holt (1891) lists two 'small spotted Dogs' as being found at Station 9. However, *Brachiella thynni* is normally a parasite on large scombrid fish, which were not taken at Station 9. In all probability there has been some mix-up with the host, hence the use of the term 'supposed' on the label. New to Ireland.

***Clavella adunca* (Strøm, 1762)**

(= *Lernaea uncinata* O. F. Müller, 1776)

(= *Lerneae uncinata* O. F. Müller, 1776)

(= *Anchorella uncinata* (O. F. Müller, 1776))

(= *Clavella uncinata* (O. F. Müller, 1776))

Antrim: Larne (Baird, 1850, as *Anchorella rugosa*; Pearson, 1905, as *Anchorella uncinata* and *Anchorella emarginata*; Scott and Scott, 1913, as *Clavella rugosa*); Larne and Holywood (W. Thompson, 1856); **Cork:** Barloge Creek, near Lough Hyne (Holmes, 1996); 5♀ (one with dwarf ♂ attached), near the Kedges (W0624), from gills of *Pollachius pollachius*, 14 July 1981, JMCH; **Dublin:** Dublin market (W. Thompson, 1856); Dublin Bay (Anon., 1893; O'Riordan, 1966b); **Ireland:** Rockall area (Calman and Wright, 1897) - this record, as *Anchorella* sp., is represented by a single specimen in NMI. It was labelled *Anchorella berylae*, from 'coal-fish', and it is here confirmed by the author as *C. adunca*.

Marine, parasitic on gadoids, notably cod *Gadus morhua* and whiting *Merlangius merlangus* (O'Riordan, 1966b). The listing of *Clavellisa emarginata* for Ireland in *Limnofauna Europaea* (Fryer, 1978) is probably based on Pearson's listing of *Anchorella emarginata*, here placed under *Clavella adunca*. The true *Clavellisa emarginata* (Krøyer, 1837) is a parasite of shads *Alosa* spp. (Kabata, 1979), and has not so far been recognised in Ireland.

****Clavella alata* Brian, 1906**

Kerry: 1♀, west-north-west of Skelligs, from gill of *Phycis blennoides*, April 1984, K. Flannery (NMI). New to Ireland.

Bull. Ir. biogeog. Soc. 22

Marine, parasitic on *Phycis* spp. (Kabata, 1992).

***Clavella stellata* (Krøyer, 1838)**

Ireland: coast of north Ireland (Kabata, 1962).

Marine, parasitic on the skin of hake *Merluccius merluccius* (L.) (Kabata, 1962).

****Clavellisa scombri* (Kurz, 1877)**

Cork: 2♀♀, off Sevenheads, trawl, *in situ* on gill fragments from *Scomber scombrus*, November 1983, R. Fitzgerald (NMI); 2♀♀ (one with dwarf ♂ attached), the Daunt Rock (W8251), off Cork Harbour, gills of *Scomber scombrus*, 7 October 1989, D. Minchin (NMI).

Marine, parasitic on the gills of mackerel *Scomber scombrus* (Kabata, 1979). New to Ireland.

***Lernaeopoda bidiscalis* Kane, 1892**

Kerry: between Valentia and the Skelligs (Kane, 1892).

Marine, parasitic, usually on the claspers of tope *Galeorhinus galeus* (L.) (Scott and Scott, 1913).

***Lernaeopoda galei* Krøyer, 1837**

Antrim/Down: Belfast Bay (W. Thompson, 1847, 1856; Baird, 1850); **Dublin:** 1♀, Dublin Bay area, from cloaca of *Scyliorhinus canicula* (L.), October 1981 (NMI); **Kerry:** between Valentia and the Skelligs (Kane, 1892).

Marine, parasitic on various small sharks; tope *Galeorhinus galeus*, smooth hound *Mustelus mustelus* (L.), lesser spotted dogfish *Scyliorhinus canicula* (Kabata, 1979).

***Lernaeopodina longimana* (Olsson, 1869)**

(= *Lernaeopodina cluthae* (T. Scott, 1900))

Down: Irish Sea, landed at Portaferry (Gotto, 1955).

Marine, parasitic on rays, e.g., *Raja montagui* Fowler, *R. fullonica* L., *R. radiata* Donovan (Kabata, 1979).

***Salmincola gordonii* Gurney, 1933**

Galway: Rivers Corrib and Abbert (Conneely and McCarthy, 1984); **Ireland:** Ireland (Fryer, 1982).

Freshwater, parasitic in gill chamber of trout *Salmo trutta* (Fryer, 1982; Kabata, 1992).

***Salmincola salmoneus* (L., 1758)**

(= *Lernaeopoda salmonea* (L., 1758))

Galway: Corrib catchment area (Conneely and McCarthy, 1984); several specimens, Roundstone Bay, *in situ* on gill of *Salmo salar*, date and collector unknown (NMI); **Meath:** River Blackwater (O'Riordan, 1966b); **Ireland:** north of Ireland (W. Thompson, 1856, as *Brachiella salmonea* Templeton) - both Pearson (1905) and Scott and Scott (1913) interpreted this record as *Lernaeopoda salmonea*; widespread in Ireland (Kane, 1966); Ireland (O'Riordan, 1966b; Kennedy, 1974).

Marine and freshwater, attached to the gills of salmon *Salmo salar* (Scott and Scott, 1913).

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Bull. Ir. biogeog. Soc. 22

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Bull. Ir. biogeog. Soc. No. 22 (1998)

IS *VIVIPARUS VIVIPARUS* (LINNAEUS) (GASTROPODA: PROSOBRANCHIA) A NATIVE SPECIES OF IRELAND?

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Introduction

Cotton (1996) made the first records of living specimens of the river snail *Viviparus viviparus* (L.) in Ireland from the Acres Lake, Drumshambo, Co. Leitrim, in August 1995. Three specimens of 19.5-24mm spire height were retained, including one dead shell, and there were also some small live individuals. In June the following year, they were present at a density of approximately 80m⁻². Although this was the first living record from Ireland, there have been earlier collections of shell material, reviewed by Cotton (1996), which included specimens which may have originated either from Newtownards, Co. Down, or Naas, Co. Kildare. Other shell specimens were collected from the tidal region of the River Shannon below Limerick. Twenty-nine specimens were dredged from the Barrow and Suir rivers over the period 1913 to 1917, but these may be sub-fossils. Cotton (1996) cited Helena Chesney's records of specimens removed from a lignite deposit near Lough Neagh, Co. Antrim. The lignite was laid down during the previous interstadial period.

It is known that *V. viviparus* has been introduced to Norway (Økland, 1990) and Cotton (1996) suggested that *V. viviparus* may have been introduced to Ireland because of its highly localised distribution in one small Irish lake. He also suggested that this introduction may have been by foreign anglers importing snails as live bait.

In this account, three new site records are described, from the Upper Shannon and Boyle

catchments.

Methods

Snails were collected by means of a draw-to hoe, which had a 15cm blade with an attached mesh pocket, all mounted on a 3m telescopic handle. By drawing the hoe upward on vertical surfaces, the snails became detached and accumulated in the mesh pocket. The piles associated with marinas, and metal shuttering or concrete walls associated with berthing areas beside locks, were examined. Navigation posts, buoys, bridge buttresses and other smooth surfaces were scraped, where possible. The objective of the survey was a study on the zebra mussel *Dreissena polymorpha* (Pallas), recently introduced to Ireland (Minchin and Moriarty, 1998). All specimens of *V. viviparus* during this survey were retained and measured. Measurements of specimens are of shell height.

A total of fifty-three stations were examined, ranging from Killaloe in southern Lough Derg to Belturbet in Upper Lough Erne, and also Lough Key and the southern region of Lough Allen.

Results

Viviparus viviparus was collected from four localities. These include the site described by Cotton (1996) at Acres Lake. These are:-

Co. Leitrim

1. Acres Lake (G967099). Snails were attached to the steel supporting piles of the marina, from the outermost region at a depth >4m to close to the shore attached to rubble at a depth of less than 1m. Two distinct modes of spire height of the 75 snails were present (Fig. 1). The largest specimen found was 29mm. No other snails were collected at this site.
2. Drumleague Lock (G954075). Fourteen snails, each with eroded spires, were found attached to the vertical face at the berthing area above the lock. Two distinct modes were present (Fig. 1). The largest specimen was 30mm. These were the only snails present in samples.

Co. Roscommon

3. Rockingham, Lough Key (G844043). The piles of the small marina produced 47 snails with what appear to be two size distribution modes (Fig. 1). The largest specimen was 34mm spire

height. Other small gastropods were present.

4. Carrick-on-Shannon (M935994) (M939992). Snails were found attached to the stone quay, about 50m downstream of the bridge. Three specimens were found in April 1998 and one in July 1998. The wooden piles at the site of the Emerald Star marina provided the largest sample. The largest specimen found was 38mm. Size frequencies of a smaller sample of 307 snails demonstrated one large mode and smaller individuals (Fig. 1). Snails were abundant near the shore. Closer to the middle of the river, there were extensive mats of sponges attached to hard surfaces.

The ranges of water quality measurements during the study were: pH 6.9-8.0; water transparency 0.4-1.2m; hardness, CaCO₃ 67-235.

Discussion

Size frequency distributions exhibit most of the snails in the larger modal size, indicating either that there has been a lower level of recent recruitment or that the larger mode is composed of more than one-year class. Cotton reported (1996) the release of young in August. Should young be consistently produced at this time, then the smallest mode would represent the 1997 year class, and the largest mode older specimens. The largest specimen, 38mm, may represent the 1995 or an earlier year class.

No zebra mussels were found attached to any of the snails although they were collected together in Rockingham and Carrick-on-Shannon. The density of zebra mussels were estimated at 1-10m⁻². In the Klaipeda Lagoon, Lithuania, many zebra mussels attach to *V. viviparus* (Sergej Olenin, pers. comm.). However, it is possible that the numbers of zebra mussels in the Upper Shannon and in the Boyle catchment are presently not sufficiently abundant for them to become attached to snails.

V. viviparus has seldom been recorded in Ireland, possibly because it is found in turbid waters. Only three snails were obviously visible at the time of collection, and then because they were close to the surface.

Viviparus viviparus, as its name would suggest, has no free-swimming larval stage. This could explain why it has a highly localised distribution. The areas where it was collected all have access, either from the waterway (Drumleage Lock) or from the road network (all other

stations). All of the areas sampled were on navigable waterways. Following a study of over 300 vessel hulls within the area, over the period 1997 to 1998, there is no evidence of transport of the species on the hulls of boats. Although dispersion by boats is possible, it is not thought to be likely. This is because young stages would have to crawl from the substrate to the boat hulls, and this may be difficult unless the boats rest on the substrate where a population exists. There is no indication that *V. viviparus* has been used as bait for fishing, although the species is capable of withstanding some aerial exposure, and so could be imported. All the evidence points to a species that has existed in Ireland during the previous glacial interstadial period, and has been present in Ireland since the middle of the last century. Its highly localised distribution may be the reason why so few records of the species exist, as the following examples demonstrate. In Carrick-on-Shannon beside the bridge, only two individuals were found whereas about two hundred metres away there were high densities present and these could have exceeded 100m^{-2} . At Lough Key, none were found at a similar distance from the population found there. The size distributions of the snails suggest that there were three or more year classes, indicating frequent reproductive success, almost certainly having taken place in three consecutive years.

Økland (1990) summarised the range of the species as being central and eastern Europe to the Dvina River basin. In Norway, using a circular scoop, he collected 26 individuals per half-hour of collection. Although his methods of capture were different to those used in this study, it would appear that the snails are more abundant in Ireland. In Sweden, *V. viviparus* is restricted to a few localities in the south. Økland (1990) referred to the species as occurring in areas with pH values of 6.8 to 8.6, a much broader range than that found in Ireland. He indicated that they are found in all types of water '...except strongly brownish water...'. The Irish populations were all found in relatively still-water regions of rivers, or in canals or lakes. Their absence at stations south of Carrick-on-Shannon is of interest but, because the sampling stations in this study were far apart, other localised populations may well exist. The finding of the shell below Limerick suggests either that they were present at one time, or presently exist in the lower Shannon. In Britain, the species is restricted to the southern and central regions (Kerney, 1976),

Our observations suggest that there will be further records of living populations of this snail in Ireland and that these populations are likely to be highly localised. Should populations be found in areas where there is little human activity, it would support our contention that the species is native to Ireland and that it has not been recently introduced.

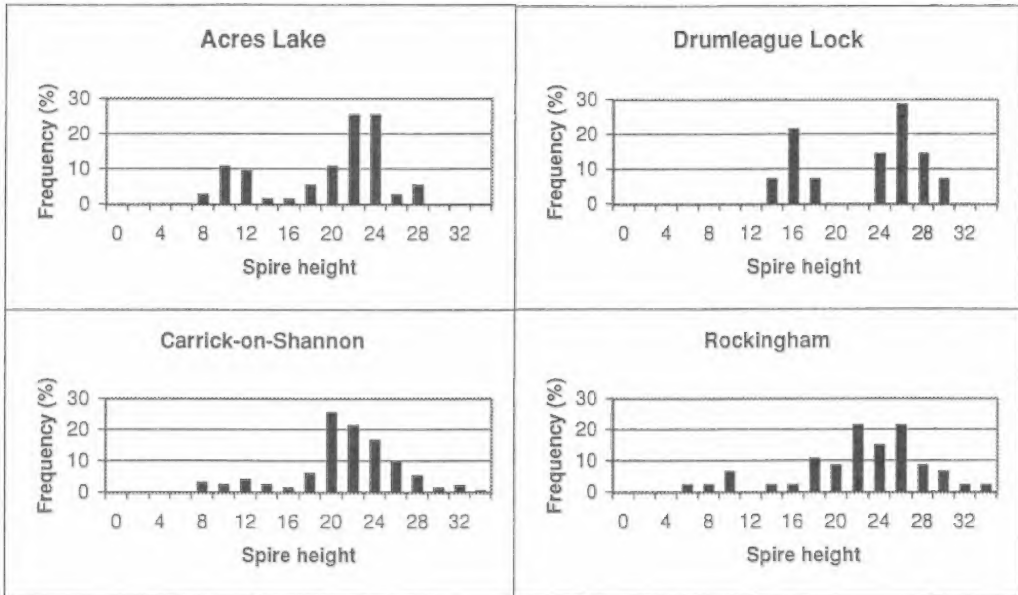
Acknowledgements

We would like to thank Mr Donal O'Brien and Mr Martin Harris of Emerald Star Ltd, for the use of a boat to enable the study to take place. We also like to thank Dr C. Moriarty for comments on the draft, and Mr Matt Nolan of the Shannon Regional Fisheries Board for his opinions on snails as live bait.

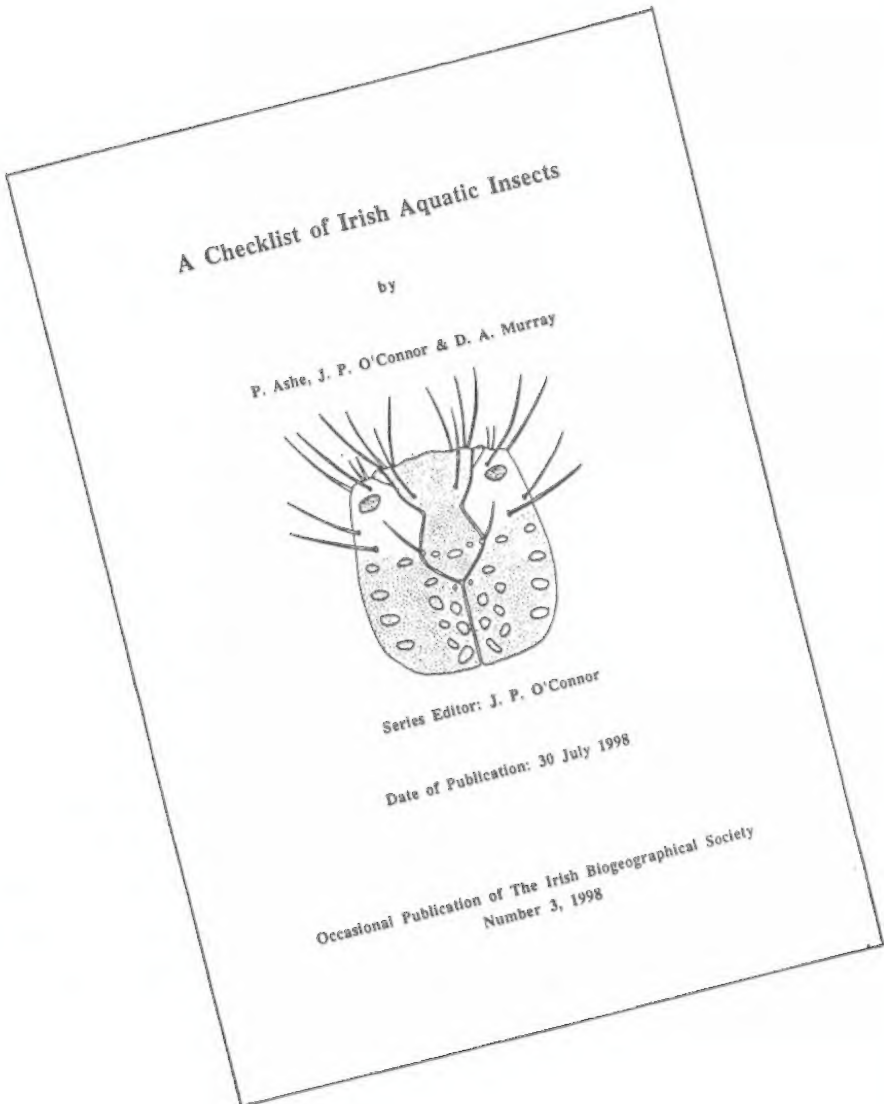
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FIGURE 1: size frequency distribution of river snail spire height from the Upper Shannon catchment.



A CHECKLIST OF IRISH AQUATIC INSECTS: for further details, please see overleaf.



A CHECKLIST OF IRISH AQUATIC INSECTS

by

P. Ashe, J. P. O'Connor and D. A. Murray

Occasional publication of the Irish Biogeographical Society, number 3. Published 30 July 1998. 80 pp. ISBN 0-9511514-2-8. Details of the price etc are given at the bottom of this page.

To celebrate the holding of the XXVII Congress of the International Association of Limnology in University College, Dublin, in August 1998, the authors decided to publish a checklist of Irish aquatic insects. Although these insects have been studied for over 150 years, the relevant information is scattered throughout numerous publications. Indeed, prior to this occasional publication, no checklists had yet been prepared for many groups. Drawing upon published and unpublished data, the authors have compiled the first checklist of the entire Irish aquatic insect fauna.

Exactly 1499 species are included in this comprehensive work. Where relevant, brief notes are included noting *inter alia* rare species and key works. It is possible therefore to refer to the most modern works on any particular group. The aquatic species of the following insect orders are listed:- Collembola, Ephemeroptera, Odonata, Plecoptera, Hemiptera, Coleoptera, Neuroptera, Megaloptera, Hymenoptera, Trichoptera, Lepidoptera and Diptera.

The volume is dedicated to the memory of the late J. R. ("Dick") Harris, in recognition of his love for Irish freshwater insects which resulted in the publication of his classic work "*An Angler's Entomology*".

Please note that although this work is an occasional publication of the Irish Biogeographical Society, it has been financed independently of the Society. **CHEQUES SHOULD BE MADE PAYABLE THEREFORE TO 'Aquatic Insects' AND NOT TO THE SOCIETY.** Copies are available from either Dr D. A. Murray, Department of Zoology, University College, Dublin 4, Ireland or Dr J. P. O'Connor, National Museum of Ireland, Kildare Street, Dublin 2, Ireland, at £6.00 (Sterling or Irish Pounds, including postage and packaging).

BOOK REVIEWS

URBAN FLORA OF BELFAST by Stan Beesley and John Wilde. Cover watercolour and line drawings by Diana Oxlade. pp ix, 196, map. Institute of Irish Studies, Queen's University of Belfast. 1997. ISBN 0 85389 695 X. Price £8.50 Sterling.

In 1984 a small group of Dublin-based botanists produced a *Flora of Inner Dublin*, the first true urban flora of any Irish city. Although the *Urban Flora of Belfast* makes no acknowledgement of the fact, Stan Beesley and John Wilde's flora was directly inspired by the Dublin work, and imitates it in some aspects, notably the attractive line-drawings of urban landscapes with plants in the foreground (but why are these plants not named?). In other respects, however, it adopts a more systematic approach in terms of recording. A small dedicated army of recorders, members of the Belfast Naturalists' Field Club, have recorded the city flora on a regular 1 x 1km grid square basis rather than using the somewhat arbitrary zones of the Dublin project.

One of the more interesting features, and in the long term probably the most valuable, is a chapter which details each grid square in terms of its vegetation at the time of the survey and its physiographic features. But the bulk of the book is a species by species account which details the distribution of each plant (only vascular plants are included), with ecological and historical notes where appropriate. In the main the project was conceived as a snapshot of the flora as it was in the years 1993-1995 and little attempt has therefore been made to include historical records.

A sketch map of the area showing the grid squares, the main roads and railway lines and the course of the River Lagan is included at the back of the book. I should like to have seen a little more information on the map - some of the other rivers and streams for example, or some indication of geology and topography. The Lagan splits the area into two very different areas in terms of surface geology, the Antrim basalt to the west and north, the Co. Down shales to the east, with large areas of sand along the course of the Lagan itself.

The work is interesting and one which will be invaluable as a bench mark against which to monitor changes - what will the flora be like a century from now? And what new species will have established themselves on the waste ground and river banks? A similar survey

encompassing lichens and bryophytes would make a good complementary project.

PAUL HACKNEY

DANDELIONS OF GREAT BRITAIN AND IRELAND by A. A. Dudman and A. J. Richards with illustrations by Olga Stewart. BSBI Handbook No. 9. The Botanical Society of the British Isles, Green Acre, Wood Lane, Oundle, Peterborough PE8 5TP, England. 1997. ISBN 0 901158 25 9. Price £17.50 Sterling (Europe £18.50 Sterling).

The study of Dandelions, which has long had an equivocal status in the British Isles, gained momentum with the publication of Richards' very significant paper published in *Watsonia* in 1972. Substantial progress has taken place in the recognition and identification of the *Taraxacum* genus since then, and much revision in nomenclature has occurred. The 1st edition of the *Census Catalogue of the Irish Flora*, published in the same year, lists just four taxa including *Taraxacum officinalis*. Whereas the second edition in 1987 lists 78 'microspecies'. The handbook contains distribution maps for more than 80 microspecies which occur in Ireland and gives the vice county distribution for some additional ones. Only one, *T. webbiai*, is endemic to Ireland. Doubt is thrown on the status, in Ireland, of '*T. gotlandicum*' which has been reported on sand hills near Fanore in Co. Clare. Distributions are reasonably well known in less than half of the Irish vice counties but in others, there is much work to be done.

This handbook maintains the standard of excellence which one has come to expect from the BSBI series. The eleven page introduction gives a brief history of the study of dandelions, their evolution, apomixis, plasticity, ecology and distribution, together with advice on collection and identification. The advice on where and when to collect your specimens and of their curation is essential reading for successful identification. A most definite warning and challenge is given to the incipient taraxacologist - "there will be confusion and frustration ahead: dandelions are difficult". Those who believe or hope, that given time, this apomictic genus will mutate itself into oblivion before the next ice age, will be disappointed to find convincing arguments as to why this is unlikely to happen. One important factor in its continued survival, is the dandelion's very efficient adaptation for the wind dispersal of its achenes. Hence the ruderal habitats and alien origins of many of the microspecies.

A number of identification keys are provided. The key to the eight *Taraxacum* Sections

follows Stace's *New Flora of the British Isles* (1991). There follow keys to each of the Sections of which by far the largest is the Ruderalia. If you successfully negotiate the dichotomous Section keys, you may find up to five possibilities at the end of the line. We are also provided with a multi-access key which is designed for use with living material in good condition. This uses the whole alphabet, with 26 common "character states" and then 18 other "rarer" states from which to choose.

The Systematic Section is well laid out and typically consists of a description of each species, giving dimensions and size range, status (native/endemic/introduced) and the known vice county distribution in Britain and Ireland. There are generally two illustrations - a life-size drawing of the capitulum, from living material, and a silhouette of a plant from the authors' own herbarium. Inevitably, the silhouettes lack the crispness of the line drawings previously used by Richards, which were pleasing to the eye. Distribution maps are included in a separate section, where there are sufficient records available or where geographical distribution is deemed significant. A glossary, accompanied by a pictorial explanation of many of the characters, is provided. There is an index of species with species numbers together with a list of names which were formerly used, sometimes in mistaken identifications.

I look forward to field testing the handbook in April, the dandelion month.

DAVID NASH

INSTRUCTIONS TO CONTRIBUTORS

1. Manuscripts should follow the format of articles in this *Bulletin*.
2. Manuscripts should be submitted as typed copy on A4 paper, using double-spacing and 2.5cm (1 inch) margins. Whenever possible, also submit the text on diskette. Wordperfect 5.1 is preferred.
3. Figures should be submitted in a size suitable for reduction to A5 without any loss of detail.
4. Records: please ensure that, when possible, the following information is incorporated in each record included in a manuscript:-
 - (a) latin name of organism.
 - (b) statement of reference work used as the source of nomenclature employed in the text. The describer's name should be also given when a zoological species is first mentioned in the text.
 - (c) locality details including at least a four figure Irish grid reference (e.g. N3946), county, vice-county number and some ecological data about the collection site, plus date of capture.
 - (d) collector's name and determiner's name (where different from collector's name), and
 - (e) altitude data should be included where relevant.
- (5). Manuscripts should be submitted to the Editor, Dr J. P. O'Connor, at the following address:- National Museum of Ireland, Kildare Street, Dublin 2, IRELAND.

NOTICES

APPEAL FOR RECORDS OF SOCIAL WASPS

The Bees, Wasps and Ants Recording Society (BWARS) will be carrying out a survey of the Social wasps (Vespidae: Vespinae) of Britain and Ireland during 1999 and 2000. Ireland has six species of social wasp: *Vespula rufa* (Red Wasp), *Vespula vulgaris* (Common wasp), *Vespula germanica* (German wasp), *Vespula austriaca* (Cuckoo wasp), *Dolichovespula sylvestris* (Tree wasp), and *Dolichovespula norwegica* (Norwegian wasp). In recent years there have been changes to the distribution and abundance of some species of social wasp in Great Britain. There are also suggestions that *Vespula vulgaris* is becoming less common. Are these changes also happening in Ireland? Two species of social wasp, *Dolichovespula media* and *Dolichovespula saxonica* were added to the British list during the 1980's and are now relatively abundant there. Has either of these species reached Ireland yet? Although there have been some anecdotal reports in the news media during the past summer, a specimen of either species has yet to be positively identified from Ireland. Records of social wasps can be sent to either of the named contacts below. In addition, dead specimens of social wasps can be sent for positive identification. This is done simply, by enclosing the dead wasp(s) in a piece of tissue paper, placing in an empty matchbox, and posting in an ordinary envelope to either of the addresses below. If a reply is requested, please also include a stamped self-addressed envelope.

CONTACT NAMES AND ADDRESSES:

1. Colm Ronayne, 33 Dublin Road, Skerries, Co. Dublin.
2. Brian Nelson, Dept. of Zoology, Ulster Museum, Botanic Gardens, Belfast BT9 5AB.

BWARS FIELD MEETING IN SOUTH EAST IRELAND, JULY 1999.

In July 1999 (Saturday 10th - Saturday 17th), the Bees, Wasps and Ants Recording Society (BWARS) intends visiting Counties Wexford, Waterford, Carlow, and Kilkenny. The aims of the visit are:

1. To assess the present day condition of sites from which the late A. W. Stelfox (1883-1972) recorded scarce and endangered species of aculeate Hymenoptera.
2. To look for possible new additions to the Irish list. In recent years some species (including

Bull. Ir. biogeog. Soc. No. 22

two species of social wasp, recently arrived in Britain, and not yet recorded from Ireland) have dramatically expanded their ranges in Great Britain.

3. To increase our knowledge of the biogeography of the Irish aculeate fauna. Visits to potentially rich sites from which few or no records are currently known, are planned. The visiting group will include some leading British and Irish experts on the identification of the aculeate Hymenoptera. This is an opportunity for Irish naturalists who have a general interest in entomology and an interest in bees, wasps, and ants in particular to learn more about the species occurring in Ireland.

For further information contact (before March 1999): Colm Ronayne, 33 Dublin Road, Skerries, Co. Dublin.

E-mail: colmronayne@tinnet.ie

**ROYAL IRISH ACADEMY
PRAEGER COMMITTEE FOR FIELD NATURAL HISTORY**

Grant Information

Grants, not normally exceeding IR£300 in any one year, are available for field work relevant to the natural history of Ireland. Grantees need not be based in Ireland. Applications are particularly welcome from amateurs. Awards cannot be made in support of undergraduate or postgraduate student programmes or for any part of the applicants' professional work. Preference will be given to projects which concern sites of special scientific interest and/or endangered species. Applicants should ensure that the proposed work, or work closely resembling the proposal, has not already been carried out in the same geographical area.

A representative set of any material collected must be deposited in the National Museum, Dublin, or the National Herbarium, Dublin, or the Ulster Museum, Belfast or any other recognised institution in Ireland.

Application forms, which should be returned by **15th February**, are now available from:

*The Secretary,
Praeger Committee,
Royal Irish Academy,
19 Dawson Street,
Dublin 2,
IRELAND*



IRISH NATURALISTS' JOURNAL

The *Irish Naturalists' Journal*, successor to the *Irish Naturalist*, commenced publication in 1925. The quarterly issues publish papers on all aspects of Irish natural history, including botany, ecology, geography, geology and zoology. The *Journal* also publishes distribution records, principally for cetaceans, fish, insects and plants, together with short notes and book reviews.

Current subscription rates for four issues (including postage) are – £IR15.00 (£14.00stg). Further details may be obtained from Ms Catherine Tyrie, Ulster Museum, Botanic Gardens, Belfast BT9 5AB.

